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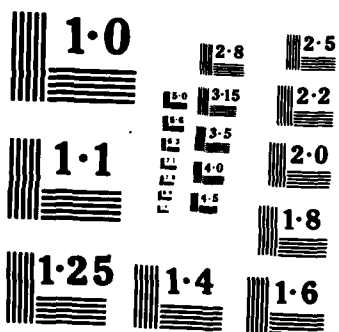
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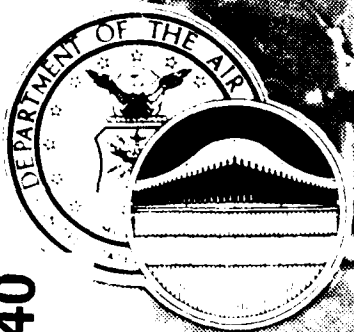
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UNITED STATES AIR FORCE

OCCUPATIONAL SURVEY REPORT

HEATING SYSTEMS CAREER LADDER
AFSC 545X2

CIVILIAN OCCUPATIONAL SERIES
4204, 4742, 4749, 5402, 5406, AND 5309

AFPT 90-545-512

JANUARY 1985

OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
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HQ ESC/DPTE	2		2	
HQ MAC/DPAT	3		3	
HQ MAC/TTGT	1		1	
HQ PACAF/TTGT	1		1	
HQ PACAF/DPAT	3		3	
HQ SAC/DPAT	3		3	
HQ SAC/TTGT	1		1	
HQ SPC/MPPT	1		1	
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HQ TAC/TTGT	1		1	
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PREFACE

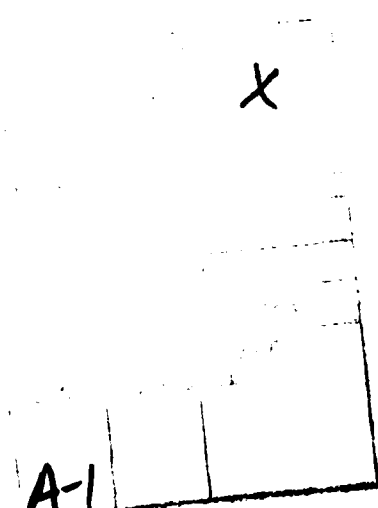
This report presents the results of a detailed Air Force Occupational Survey of the Heating Systems career ladder (AFSC 545X2) and related civilian occupational series 4204, 4742, 4749, 5402, 5406, and 5309. The project was directed by USAF Program Technical Training, Volume Two, dated June 1981. Authority for conducting occupational surveys is contained in AFR 35-2. Computer printouts from which this report was produced are available for use by operating and training officials.

The survey instrument was developed by Second Lieutenant Ronald Clontz, Inventory Development Specialist. Ms Vera Frechel provided computer programming support for the project. Second Lieutenant Dana H. Lindsley, Occupational Survey Analyst, analyzed the data and wrote the final report. This report has been reviewed and approved by Major Charles D. Gorman, Chief, Airmen Career Ladders Analysis Section, Occupational Analysis Branch, USAF Occupational Measurement Center.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel (see DISTRIBUTION on page i). Additional copies are available upon request to the USAF Occupational Measurement Center, Attention: Chief, Occupational Analysis Branch (OMY), Randolph Air Force Base, Texas 78150-5000.

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SUMMARY OF RESULTS

1. Survey Coverage: The Heating Systems career ladder (AFSC 545X2), and related civilian occupational series 4204, 4742, 4749, 5402, 5406, and 5309, were surveyed. The total survey sample contained 2,057 members, which included 1,080 military and 977 civilian personnel. The sample was representative across all major using commands, both for military and civilian personnel.
2. Specialty Jobs: The study identified 8 clusters, covering 10 job types, and 3 independent job types. Each cluster contained both military and civilian personnel, with the exception of the purely military Contingency or Tactical Team cluster and the Technical Training Instructor group. Most groups seemed to form as a function of what type of heating system they installed or maintained and the amount of time they spent on the tasks related to the various systems.
3. Career Ladder Progression: The 3- and 5-skill level jobs were oriented toward general maintenance functions, with little responsibility for supervision and management. Seven-skill level members, although still performing some maintenance tasks, spent the majority of their duty time in supervisory, managerial, or administrative functions.
4. AFR 39-1 Specialty Descriptions: The 3-/5- and 7-skill level descriptions accurately reflected the jobs of career ladder personnel.
5. Major Command Differences: Analysis of first-enlistment personnel across MAJCOMs showed that those assigned to PACAF spend more time maintaining and operating fuel-burning equipment. Investigation of differences in the total military sample across MAJCOMs showed few other differences.
6. Job Satisfaction: Overall, job satisfaction indicators for military groups were high. Compared to a sample of similar career ladders surveyed in 1983, 545X2 personnel responded very positively to how their present job utilizes their training.
7. Training Analysis: Both STS and POI, while requiring some review on certain proficiency codes and unmatched tasks, appear in good order and no major problems were identified.
8. Strength and Stamina: No major problems were identified.
9. Comparison of 545X2 and 545X0: A detailed comparison of data from the 545X0 OSR (1983) and this survey reveals a high degree of commonality in the tasks these two specialties perform. The results of a workshop attended by subject-matter specialists from both specialties confirms this finding.

**OCCUPATIONAL SURVEY REPORT
HEATING SYSTEMS CAREER LADDER
(AFSC 545X2)**

INTRODUCTION

This is a report of an occupational survey of the Heating Systems career ladder (AFSC 545X2) completed by the Occupational Analysis Branch, USAF Occupational Measurement Center, in January 1985. The specialty was last surveyed in 1977. This survey was requested by 3700 TCHTGW/TTGXD to obtain current task and equipment data for use in evaluation and management of training programs for this career ladder. It also was programmed to look at the commonality in tasks performed by 545X2 and 545X0 (Refrigeration and Cryogenics) career ladder personnel.

This survey includes both military and civilian members. The request to survey civilian personnel came from the Air Force Engineering and Services Center (ESC), Tyndall AFB, Florida. Civilian members who completed the survey booklet did so on a voluntary basis; thus, civilian total representation in some areas is not as good as the military.

Those civilians included in this study are in the following wage grade (WG) series:

- 4204 - Pipe Fitter
- 4742 - Utility Systems Repairer-Operator
- 4749 - Maintenance Mechanic
- 5402 - Boiler Plant Operator
- 5406 - Utility Systems Operator
- 5309 - Heating and Boiler Plant Equipment Mechanic

The Office of Civilian Personnel Operations (OCP0) provided support for this study by supplying civilian mailing lists, wage grade series, and paygrade information.

Background

The Heating Systems Career Ladder's current 545X2 designation was assigned in April 1981. Prior to that date, career ladder members were identified as Heating Specialists (AFS 565X0) from May 1951. In September 1964, this designation was changed to AFS 547X0, with a shredout (547X0A) for Plant Operators. The shredout was deleted in April 1976, and the current designation (AFS 545X2) was assigned in April 1981.

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As described in AFR 39-1, personnel in this career ladder install, maintain, repair, and operate heating plants, systems, and equipment. In addition, more experienced personnel plan, inspect, and modify these plants and systems, and supervise heating systems activities. For the military, primary entry into the career ladder is from Basic Military Training School (BMTS) through a Category B, 9-week formal training course conducted at Sheppard AFB, Texas. Descriptions for the related civilian series are given in Appendix B.

SURVEY METHODOLOGY

Inventory Development

The data for this survey were collected with United States Air Force Job Inventory AFPT 90-545-512. Using the last inventory, dated September 1975, as a base, this current inventory was developed from interviews at five different operational bases and the Technical Training Center at Sheppard AFB. The current inventory consists of a task list and a background section. The task list contains 668 tasks divided into 20 functional areas called duties. The background section was modified for civilian administration and includes two sections. One pertains to both civilians and military, the other only to active duty military. The general section includes such items as job title, shift schedule, test equipment used, types of heating systems, and assigned functional area. The military section includes questions on the number of PCS remote assignments, contingency team assignments, standard military background questions, and a section containing questions from the Air Force Academy.

Survey Administration

The inventory was distributed to consolidated base personnel offices (CBPO) in operational units worldwide for administration to 1,306 military incumbents selected from a computer-generated mailing list obtained from the Air Force Human Resources Laboratory (AFHRL), Brooks Air Force Base, Texas, and 2,442 civilian job incumbents selected from a mailing list provided by the Office of Civilian Personnel Operations (OCPO). The surveys were then distributed through the Chief of Operations (DEM).

To complete the survey, each incumbent first answered the background section (identification and biographical information) and then checked each task performed in their current job. After checking all tasks performed, each member rated each task checked on a 9-point scale showing relative time spent on that task as compared to all other tasks checked. The ratings ranged from one, representing a very small amount of time spent, to nine, representing a very large amount of time spent. All of the incumbent's ratings are combined and the total assumed to represent 100 percent of time spent on the job. Each task rating is divided by this total and multiplied by 100 to obtain the relative time spent for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percent time spent.

Task Factor Administration

In addition to completing the job inventory, selected senior 545X2 personnel also completed a second booklet for either training emphasis (TE) or task difficulty (TD). The TE and TD booklets were processed separately from the job inventories. The information is used in a number of different analyses discussed in more detail later within this report.

Task Difficulty (TD). Each individual completing a TD booklet was asked to rate all of the tasks on a 9-point scale (from extremely low to extremely high) as to relative difficulty of each task in the inventory. Difficulty is defined as the length of time required by the average member to learn to do a task. TD data were independently collected from 75 experienced 7-skill level personnel stationed worldwide (see Table 1). The interrater reliability (as assessed through components of variance of standard group means) of .92 for 545X2 raters suggests a high agreement among raters as to the degree of difficulty of each task. TD ratings were adjusted to give a rating of 5.00 to a task of average difficulty, with a standard deviation of 1.00. The data are then used to rank order the tasks in the inventory by degree of difficulty.

Strength and Stamina Requirements. These NCOs also were asked to indicate the tasks that any of the 545X2 personnel they supervise have experienced difficulty performing because of excessive physical strength or stamina requirements inherent in the task. Specific write-in comments are addressed in the STRENGTH AND STAMINA Section of this report.

Job Difficulty Index (JDI). After computing a task difficulty rating for each task item, it is possible to also compute a JDI for the job groups identified in the survey analysis. This index provides a relative measure of which jobs are more or less difficult when compared to other jobs identified. The number of tasks performed and the average difficulty per unit time spent (ADPUTS) are used as variables in an equation to calculate the JDI. The index ranges from 1.0 for very easy jobs to 25.0 for very difficult jobs. The indices are adjusted so the average JDI is 13.00.

Training Emphasis (TE). Individuals who completed TE booklets were asked to rate tasks on a 10-point scale (from no training required to extremely high training required). TE is a rating of which particular tasks require structured training for first-term personnel. Structured training is defined as training provided at resident technical training schools, field training detachments (FTD), mobile training teams (MTT), formal OJT, or any other organized training method. TE data were collected independently from 150 experienced 7-skill level personnel stationed worldwide (see Table 1). The interrater reliability (as assessed through components of variance of standard group means) for these raters was high (.91), indicating there was a high agreement among raters as to which tasks required some form of structured training and which did not. In this specialty, tasks rated high in TE have ratings of 5.23 and above. The average TE rating was 3.61, and the standard deviation of ratings was 1.62. When used in conjunction with other factors, such as percent members performing, TE and TD ratings can provide an insight into training requirements. This may also validate the lengthening or shortening of specific units of instruction in various training programs.

TABLE 1
COMMAND DISTRIBUTION OF TASK DIFFICULTY
AND TRAINING EMPHASIS RATINGS

<u>COMMAND</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF TD RATERS</u>	<u>PERCENT OF TE RATERS</u>
SAC	22	23	24
TAC	11	15	10
MAC	16	16	15
AFLC	8	11	10
USAFE	12	9	7
ATC	13	13	12
PACAF	7	7	7
AAC	4	4	2
AFSC	5	2	7
OTHER	<u>3</u>	<u>*</u>	<u>6</u>
TOTAL	100	100	100

* Less than .5 percent

Data Processing and Analysis

Once job inventories are returned from the CBPOs, the background information and task responses are checked for proper completion. The data are then entered into the computer. A series of related computer programs, called the Comprehensive Occupational Data Analysis Programs (CODAP), are then applied to the data to aid in analysis.

Survey Sample

Military. Personnel were selected to participate in this survey to ensure an accurate representation across major commands (MAJCOM) and paygrade groups. All eligible 545X2 personnel were mailed survey booklets. Table 2 reflects the percentage distribution, by major command, of respondents in the military survey sample. The 1,080 military respondents included in the final sample represent 68 percent of the total assigned 545X2 personnel. Table 4 reflects the paygrade group distribution, while Table 6 lists the military sample distribution by TAFMS groups. As reflected in these tables, the military survey sample is an excellent representation of the career ladder personnel.

Civilian. The 2,442 civilian personnel were selected from a mailing list provided by the Office of Civilian Personnel Operations (OCP0). Surveys were then administered through the Chief of Civil Engineer Squadron to all eligible civilian series 4204, 4742, 4749, 5402, 5406, and 5309 personnel. Only civilian personnel in CONUS were surveyed. Table 3 shows the final civilian survey

sample. The 40 percent return, although it is much lower than the military return, was expected due to the voluntary nature of the civilian survey administration.

TABLE 2

COMMAND DISTRIBUTION OF MILITARY SURVEY SAMPLE

<u>COMMAND</u>	<u>PERCENT OF ASSIGNED (N=1,584)</u>	<u>PERCENT OF SAMPLE (N=1,080)</u>
SAC	24	24
TAC	17	18
MAC	14	15
AFLC	12	13
USAFE	8	7
ATC	8	7
PACAF	7	7
AAC	5	3
AFSC	3	3
OTHER	3	2

Total Assigned: 1,584

Total Eligible: 1,306*

Total in Sample: 1,080

Percent of Assigned in Sample: 68%

Percent of Eligible in Sample: 83%

* Excludes those in training, hospital, or PCS status

TABLE 3

COMMAND DISTRIBUTION OF CIVILIAN SURVEY SAMPLE

<u>COMMAND</u>	<u>PERCENT OF EMPLOYED**</u>	<u>PERCENT OF SAMPLE</u>
SAC	23	30
AFLC	19	21
ATC	17	17
MAC	14	11
TAC	12	10
AFSC	5	5
AAC	4	*
OTHER	6	6

Total Employed: 2,442

Total in Sample: 977

Percent of Employed in Sample: 40%

* Less than .5 percent

** As of March 1984

TABLE 4

PAYGRADE DISTRIBUTION OF MILITARY SURVEY SAMPLE

<u>PAYGRADE</u>	<u>PERCENT OF ASSIGNED**</u>	<u>PERCENT OF SAMPLE</u>
E-1 and 2	10	8
E-3	25	28
E-4	28	24
E-5	23	24
E-6	9	11
E-7	5	4
E-8	*	*

* Less than .5 percent

** As of September 1983

TABLE 5
CIVILIAN SERIES DISTRIBUTION OF SURVEY SAMPLE

<u>SERIES</u>	<u>PERCENT OF EMPLOYED**</u>	<u>PERCENT OF SAMPLE</u>
4204	13	14
4742	8	6
4779	*	*
5402	46	45
5406	9	2
5309	24	34

* Less than .5 percent

** As of March 1984

TABLE 6
TAFMS DISTRIBUTION OF MILITARY SURVEY SAMPLE

<u>TAFMS (MONTHS)</u>	<u>PERCENT OF ASSIGNED</u>	<u>PERCENT OF SAMPLE</u>
1-48	51	46
49-96	22	23
97-144	11	13
145-192	9	10
193-240	5	6
241+	2	2

SPECIALTY JOBS (CAREER LADDER STRUCTURE)

One very important function of the USAF Occupational Analysis Program is to identify the distinct jobs performed within a career ladder and how these jobs relate to each other. The resulting display of this analysis, known as the career ladder structure, is used in a number of ways: to analyze the diversity or specialization within a career ladder which might require merging, shredding, or dividing the ladder; to examine the accuracy and completeness of career ladder documents (AFR 39-1 Specialty Descriptions, Specialty Training Standards, the basic course Plan of Instruction, etc.); to formulate an understanding of current utilization patterns; and to identify job satisfaction problems, trends, and issues requiring management attention. The structure of military heating systems personnel and related civilian series was determined on the basis of similarity of tasks performed by incumbents in the field. Each person in the study performs a subset of tasks. When matched with other people who perform the same or similar tasks and spend similar amounts of time doing so, these personnel form a job type. Job types that have a high degree of similarity are grouped into a cluster. Those jobs found too dissimilar to be included in a cluster are labeled independent job types.

Overview

Eight clusters, three independent job types, and ten job types were identified by an analysis of the survey data. Figure 1 displays these 21 groups and how they relate to each other. These clusters, job types, and independent job types are listed below. The group (GRP) number shown beside each title is a reference to computer-printed information; the number of personnel in the group (N) is also shown. The number of personnel in the job types included in each cluster does not necessarily equal the number shown for that cluster; in those cases, the jobs of the remainder of the personnel in that cluster are adequately described in the cluster description.

- I. RESIDENTIAL, SMALL BUILDINGS, AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (GRP255, N=267)
 - A. Electrical Maintenance Personnel (GRP396, N=11)
- II. BOILER AND STEAM HEATING SYSTEMS CLUSTER (GRP376, N=1,017)
 - A. Boiler Plant Operators (GRP394, N=31)
 - B. Boiler Water Treatment Personnel (GRP418, N=15)
 - C. General Heating Systems Maintenance (GRP438, N=691)
- III. CONTINGENCY TRAINERS (GRP268, N=18)
- IV. HIGH TEMPERATURE WATER SYSTEM OPERATOR CLUSTER (GRP209, N=50)
 - A. Fuel Burning Equipment Operators (GRP656, N=16)
- V. HEAT PLANT OPERATORS (GRP184, N=105)

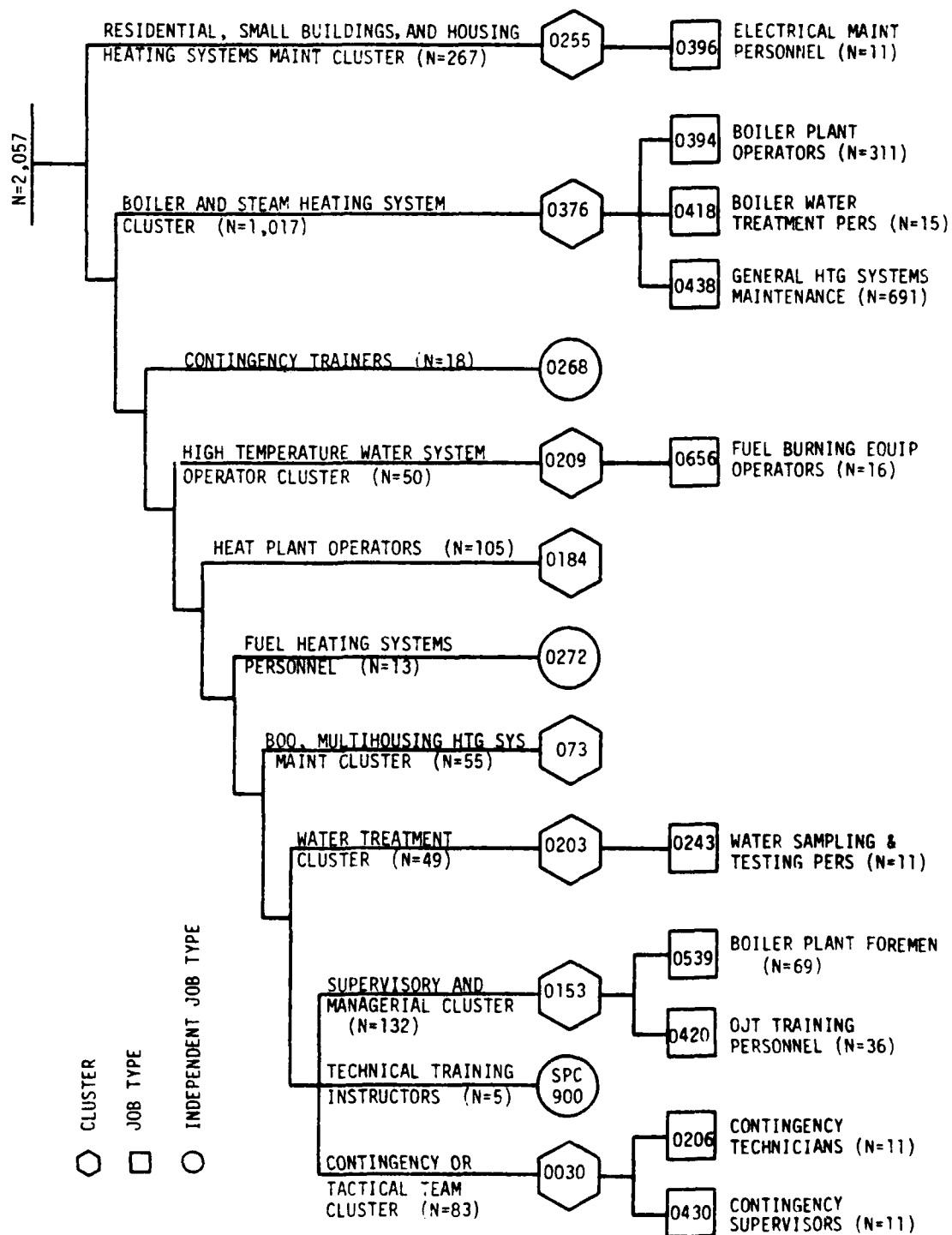
- VI. FUEL HEATING SYSTEMS PERSONNEL (GRP272, N=13)
- VII. BOQ, MULTIHOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (GRP073, N=55)
- VIII. WATER TREATMENT CLUSTER (GRP203, N=49)
 - A. Water Sampling and Testing Personnel (GRP243, N=11)
- IX. SUPERVISORY AND MANAGERIAL CLUSTER (GRP153, N=132)
 - A. Boiler Plant Foremen (GRP539, N=69)
 - B. OJT Training Personnel (GRP420, N=36)
- X. TECHNICAL TRAINING INSTRUCTORS (SPC900, N=5)
- XI. CONTINGENCY OR TACTICAL TEAM CLUSTER (GRP030, N=83)
 - A. Contingency Technicians (GRP206, N=11)
 - B. Contingency Supervisors (GRP430, N=11)

Eighty-seven percent of the survey respondents are grouped in the clusters and independent job types listed above. The remaining 13 percent perform jobs different enough that they do not group with any of the defined job types. Job titles given by these ungrouped respondents include CDC Writer, Chief of Quality Control, Coal Handler, Planning Technician, Quality Assurance Evaluator, Safety NCO, Insulator, Stationary Engineer, and Construction Management Inspector.

Group Descriptions

The following paragraphs contain brief job descriptions of the clusters, job types, and independent job types identified through the career ladder structure analysis. Included in each description and in Table 7 is information regarding the military and civilian populations of the group. It is important to note the military/civilian mix, as this may have a bearing on the characteristics of the group as a whole. Selected background data are also provided and discussed for each of the specialty jobs (see Table 8). Examples of tasks for all of the above groups are contained in Appendix A. In addition, job descriptions for each of the civilian series (U.S. Civil Service Commission Job Grading Standards) are provided in Appendix B.

FIGURE 1
CAREER LADDER STRUCTURE DIAGRAM
(AFSC 545X2)



WHERE THE NUMBER OF PERSONNEL IN THE JOB TYPES DOES NOT EQUAL THE NUMBER SHOWN FOR THAT CLUSTER, THE JOB OF THE REMAINDER OF THE PERSONNEL IS ADEQUATELY DESCRIBED IN THE CLUSTER DESCRIPTION.

I. RESIDENTIAL, SMALL BUILDINGS, AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (GRP255, N=267). This cluster consists of one job type and contains 267 members (or 13 percent of the total survey sample). The military and civilian population for the cluster and for the job type within the cluster are displayed in Table 7. As the table shows, the majority of the personnel in the cluster is military (79 percent), whereas the majority of incumbents in the Electrical Maintenance job type is civilian (64 percent). Civilian series found within this cluster and its related job type are listed in Table 9. Table 10 illustrates the average percent time spent on duties for all clusters and independent job types in the study. This section first discusses the job and personnel characteristics that typify the cluster, then describes the job type that warranted a separate description.

The responsibilities of cluster personnel are: installing heating systems and equipment, maintaining heating system components, maintaining forced warm air and other heating systems, and maintaining steam heating systems. The installation and maintenance tasks of this group describe those related to the steam or hot water (low/medium temperature) systems located in small buildings and housing. Personnel in the cluster perform an average of 126 tasks. Examples of tasks these personnel perform include:

- measure and cut pipe by machine
- thread pipe by machine
- measure and cut pipe by hand
- measure and cut copper tubing
- thread pipe by hand
- install check valves
- install circulating pumps
- install block iron condensate lines
- remove or replace electric motors

Examples of tasks that differentiate the job performed by military and civilian personnel in this cluster can be seen in Table 11. The difference in command representation is seen in the following:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	27	27
TAC	16	9
MAC	13	14
AFLC	11	25
USAFE	5	0
ATC	5	18
PACAF	16	0
AAC	5	0
AFSC	1	2

Twenty-nine percent of the military incumbents are assigned outside CONUS.

A specialized group within the cluster that merits further discussion is described below.

A. Electrical Maintenance Personnel (GRP396, N=11). This job type of 11 people is characterized by its high relative amount of time spent maintaining heating electrical systems. Examples of tasks they perform include:

- remove or replace fuses
- reset circuit breakers
- remove or replace electric motors
- inspect motors
- measure motor current draw
- inspect fuses or circuit breakers
- remove or replace relays
- isolate electrical system malfunctions

Although this group spends more time on electrical maintenance, they perform most tasks described in the cluster as well. Military members in this group average 152 tasks and civilian personnel average 137 tasks, slightly more than the cluster average of 126. The majority of the military members are found in SAC (50 percent) and ATC (with 25 percent). While the civilian representation was more like that listed in the cluster description, there were some differences between the jobs performed by military personnel in this group (36 percent) and civilian members (64 percent). These differences are covered by those discussed previously in the cluster description.

II. BOILER AND STEAM HEATING SYSTEMS CLUSTER (GRP376, N=1,017). This cluster consists of three job types and represents the largest group in the survey (1,017 members and 49 percent of the total sample). Sixty-five percent of the cluster is represented by civilian personnel and the remaining 35 percent by military members. The large civilian membership in this cluster is due to civilian series specific to these jobs. The majority of the civilians found within this cluster are from series 5309 and 5402 (26 and 24 percent, respectively). They average the highest number of tasks performed of all the clusters and independent job types (254 tasks), although a few job types within clusters average more. The responsibilities of this cluster include maintaining steam heating systems and heating system components, installing heating systems and equipment, and maintaining central steam plants. The following tasks reflect the cluster's concentration in supporting large boilers and central steam plants:

- blowdown steam heating system boiler or water columns
- light-off steam heating system boilers
- thread pipe by machine
- inspect steam heating system boiler feed and condensate pumps
- inspect steam traps
- fill steam heating system boilers

Similar to the first cluster description, these personnel are represented in each MAJCOM surveyed, with the majority in SAC, AFLC, ATC, TAC, and MAC (29, 17, 15, 14, and 12 percent, respectively). The only MAJCOM difference between civilian and military is TAC, where military representation is over twice that

of civilian, and AFLC, where civilian representation is twice that of the military. In addition, there are no civilian personnel in USAFE, PACAF, or AAC in this group. The jobs performed by both military and civilian personnel described by the cluster as a whole are very similar. The few differences are that a greater percentage of military incumbents write airman performance reports (APR), counsel personnel on personal or military-related matters, maintain training records, charts, or graphs, and evaluate OJT trainees. A greater percentage of civilian members perform tasks related to central steam plant boiler and steam heating system boiler, draft control operational checks, adjust and inspect deaerators, and inspect compressor oil levels.

The job types identified within this cluster and outlined in the overview will be discussed separately in the following paragraphs.

A. Boiler Plant Operators (GRP394, N=311). Of the 311 members in this group, 249 (80 percent) are civilian personnel. Fifty-eight percent of these are in the civilian series 5402, Boiler Plant Operator, 10 percent are in series 5309, Heating and Boiler Mechanic/Heating Equipment Repair, and 9 percent represent series 4742, Utility System Repairer-Operator, and together average 186 months civilian total federal civil service (CTFCS). The 62 (20 percent) military members average 132 months in the career field, 84 months total active federal military service (TAFMS). The following tasks are common to this group:

- check central steam plant boiler water level
- blowdown central steam plant boiler or water columns
- make entries on AF Forms 1458 (Daily Steam Boiler Plant Operation Log)
- light-off central steam plant boilers
- draw boiler water samples
- perform chemical feeding
- prepare boilers for inspections
- inspect steam lines or conduits

The differences between tasks that military and civilian personnel perform are accurately explained in the cluster description.

B. Boiler Water Treatment Personnel (GRP418, N=418). This group distinguishes itself by the amount of time spent maintaining steam heating systems and performing water treatment functions. Although they perform some operator tasks, the majority of this group's job is represented by tasks such as:

- draw boiler water samples
- test boiler water for chlorides or total dissolved solids
- test boiler water for phosphates
- test PH of condensate return
- test boiler water for causticity
- mix chemicals required to treat water
- perform chemical feeding
- blowdown steam heating system boilers or water columns

Unlike the previous job type, the majority of this group is military (73 percent). Forty-seven percent are in their first-enlistment, and 20 percent have earned the 5-skill level. The civilian members of this group are in the occupational series 5402 (20 percent) and 5309 (7 percent); all are assigned to MAC. Although the civilian sample is small (27 percent), there were noticeable differences between the jobs performed by military and civilian personnel within this group in terms of percent members performing specific tasks. These differences are listed in Table 12. The major users of these personnel are at bases with a small number of steam heating system boilers where personnel are used for both water treatment and operator functions. The major commands represented by these members are AFLC (33 percent), and SAC and TAC (each with 27 percent). The other users are MAC and AAC (with 7 percent each).

C. General Heating Systems Maintenance Personnel (GRP438, N=691). The 691 members of this group spend most of their time installing and maintaining a variety of heating systems. They are located at large bases with several heating systems and are frequently tasked to work on several different systems. Forty-one percent of the group are military personnel and 59 percent are civilian members. The majority of the civilians are in occupational series 5309 (34 percent), 4204 and 5402 (each with 10 percent). Examples of tasks performed by this group are:

- thread pipe by machine
- measure and cut pipe by machine
- measure and cut copper tubing
- measure and cut pipe by hand
- remove or replace filters
- inspect steam traps
- remove or replace check valves
- lubricate heating blowers
- remove or replace electric motors

There were very small differences in the jobs performed by military and civilian members. Other than on contingency tasks, military incumbents appear to have more members that write airman performance reports (APR), maintain training records, charts, or graphs, counsel personnel on personal or military-related matters, and counsel trainees on training progress. Likewise, the civilian personnel have more members that perform the following tasks:

- install new tubes with rolling device
- clean steam heating system boiler airflow switches
- inspect reheating systems
- perform steam heating system refractory repairs
- adjust pressure potentiometers
- remove access covers to combustion chambers or tube nest
- rebuild feed water regulators

The group as a whole averages 283 tasks, the highest number in the study. Thirty percent of these members are assigned to SAC, 17 percent to TAC and ATC,

13 percent to AFLC, and 12 percent to MAC. Commands with small representation are AAC, AFSC, PACAF, and USAFE (with 5, 3, 2, and 1 percent, respectively). Except for AFSC, the latter commands were represented by military members only.

III. CONTINGENCY TRAINERS (GRP268, N=18). This independent job type consists of 18 military personnel who spend a lot of time performing contingency or tactical team functions, along with training. They work primarily in field maintenance and shop settings, averaging 109 tasks. Tasks typical of this independent job type include:

- supervise apprentice heating systems specialists (AFSC 54532)
- supervise heating systems specialists (AFSC 54552)
- determine work priorities
- conduct OJT
- write airman performance reports (APR)
- practice personal hygiene techniques
- erect tents
- assemble and tow AM-2 matting for rapid runway repair
- tear down, inspect, clean, and reassemble M-16 rifles
- don or doff chemical warfare personal protective clothing
- prepare personal clothing and equipment for deployment

Sixty-seven of these incumbents have earned the 7-skill level, while the remaining 33 percent are 5-skill level personnel. The members represent TAC (33 percent), SAC (28 percent), MAC, AFLC, and USAFE (each with 11 percent), and PACAF (6 percent).

IV. HIGH TEMPERATURE WATER SYSTEM OPERATORS CLUSTER (GRP209, N=50). The 50 members of this cluster maintain and operate the 10 high temperature water systems operated and maintained in the Air Force. Seventy-eight percent of this cluster is represented by civilian personnel and the remaining 22 percent by military incumbents. The civilians are in occupational series 5402 (60 percent), 5309 (16 percent), and 4742 (2 percent). They perform an average of 138 tasks, some examples of which are:

- perform high temperature water heating system operational checks
- light-off high temperature water heating systems
- perform high temperature water heating system boiler preoperational checks
- inspect compressor oil levels
- inspect high temperature water heating system boilers for leaks
- blowdown condensate from air tanks
- fill high temperature water heating systems with water and bleed air from systems
- draw boiler water samples

The military and civilian incumbents appear to be performing very similar jobs. Again, other than contingency tasks, military members seem to have more members installing fusible plugs, silver brazing lines or fittings, and threading pipe by machine. Civilian members have more members performing the following tasks:

- perform high temperature water system boiler or expansion tank hydrostatic tests
- clean temperature recording equipment
- adjust air compressor pressure controls
- inspect pressurization systems
- lay up high temperature water heating system boilers
- perform adjustments at control panels to remotely reposition control devices
- reset motor thermal overloads

Half of these personnel are assigned to SAC, 18 percent to TAC, 14 percent to MAC, and 2 percent to both AFLC (all civilian personnel) and USAFE (all military personnel). A job type within this cluster warrants further discussion.

A. Fuel Burning Equipment Operators (GRP656). The 16 members of this group are civilians, occupational series 5402 (88 percent) and 5309 (13 percent*), who maintain high temperature water systems, water softeners, oil fired equipment, RPIE, and coal fired stokers. They average 123 tasks, slightly less than the cluster average of 138. Major tools used in their job include water flow meters, water analyzers, tube expanders, stack thermometers, respirators, protective clothing, pipe cutting and threading equipment, flue gas analyzers, and draft gauges. They perform shop maintenance as opposed to field maintenance. The majority are on a rotating 8-hour shift (day-swing-mid). Tasks typical of this group include:

- inspect high temperature water heating system boilers for leaks
- fill high temperature water heating systems with water and bleed air from systems
- inspect high temperature water heating system pressure relief valves
- inspect safety valves
- clean high temperature water heating system boilers
- blowdown condensate from air tanks
- inspect temperature recording equipment

Commands represented by these members are SAC, TAC, and MAC (with 31, 19, and 13 percent, respectively).

* Total does not add to 100 percent due to rounding

V. HEAT PLANT OPERATORS (GRP184, N=105). This cluster of 105 incumbents has a fairly even military/civilian mix. The civilian members are in series 5402 (51 percent), 5406 (6 percent), and 5309 (4 percent), and represent 60 percent of the cluster. The primary responsibilities of this cluster are maintaining high pressure steam systems, oil fired equipment, and gas fired equipment. Comparative analysis showed no meaningful differences between the jobs performed by military and civilian personnel. Common tasks performed by this cluster include:

- blowdown steam heating system boiler or water column
- check central steam plant boiler water level
- make entries on AF Forms 1458 (Daily Steam Boiler Plant Operation Log)
- light-off steam heating system boilers
- blowdown central steam plant boiler or water columns
- perform chemical feeding
- light-off central steam plant boilers
- draw boiler water samples

These military and civilian members are equally represented in AFLC (31 percent), SAC (22 percent), ATC (17 percent), TAC (8 percent), AFSC (3 percent), and PACAF and USAFE (only military, with 1 percent). Ninety-eight percent of the military and 100 percent of the civilians incumbents are assigned in CONUS.

VI. FUEL HEATING SYSTEMS PERSONNEL (GRP272, N=13). The 13 members of this group are more specialized, performing an average of 81 tasks. The military/civilian mix is 85 and 15 percent, respectively. While these members maintain forced warm air systems, low pressure steam systems, low temperature water systems, and unit heaters, they spend most of their time maintaining oil fired equipment. Typical tasks for this group include:

- inspect oil burners
- perform oil burner operational checks
- remove or replace oil burners
- inspect fuel lines or fittings
- inspect feed water controls (McDonnell-Miller)
- don or doff chemical warfare personnel protective clothing
- adjust oil burner fuel-air ratios

Major pieces of equipment or tools used in this job are pipe cutting and threading equipment, protective clothing, respirators, and tube and flue cleaners. The most distinguishing characteristic of this group is that 61 percent are assigned to installations outside CONUS. Major command distribution includes MAC and SAC (with 31 percent each), TAC (23 percent), and AAC (8 percent). The civilian members in this group are all assigned to bases within CONUS and spend more time maintaining boilers. They are all in occupational series 5309 (15 percent).

VII. BOQ, MULTIHOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (GRP073, N=55). The 55 members of this group perform a very limited job, averaging only 57 tasks. Their responsibilities include mostly field maintenance of domestic water heaters, forced warm air systems, gas fired equipment, low pressure steam systems, and, most abundantly, unit heaters, all of which are located in BOQ buildings and most multihousing units. Tasks common to this group include:

- measure and cut pipe by machine
- thread pipe by machine
- measure and cut pipe by hand
- install check valves
- thread pipe by hand
- install packing
- install circulating pumps
- install filters
- install electric motors
- measure and cut pre-formed insulation

The civilian personnel account for 14 percent of the cluster, and are in occupational series 4204 (6 percent), 5309 and 5402 (each with 4 percent). The jobs performed by both military and civilians seem very similar. Few differences exist, other than the commands to which they are assigned. The percent differences are evident in the following:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	19	29
TAC	12	7
MAC	19	7
AFLC	26	29
USAFE	5	0
ATC	3	21
PACAF	5	0
AAC	2	0
AFSC	2	0

Sixteen percent of the military are assigned to bases or installations outside CONUS, while the civilian members surveyed are all assigned in CONUS.

VIII. WATER TREATMENT CLUSTER (GRP203, N=49). Forty-nine members form this group that averages 52 tasks and spends 50 percent of their time on 27 tasks. These military (73 percent) and civilian (27 percent) incumbents are located at bases with one or more boilers and are primarily responsible for water treatment functions. Examples of tasks they perform include:

- test boiler water for phosphates
- test boiler water for chlorides or total dissolved solids
- test boiler water for causticity
- draw boiler water samples
- perform chemical feeding
- test pH of condensate return
- mix chemicals required to treat water
- test boiler water for sodium sulfates

The major difference in the jobs performed by military and civilian personnel is that civilian members spend the majority of their time in central heating functional areas, while military members spend the majority of their time in a heating operations-maintenance functional area. The following tasks, performed by a greater percentage of civilians, portray this difference in functional areas:

- check central steam plant boiler water level
- blowdown central steam plant boiler or water columns
- make entries on AF Forms 1458 (Daily Steam Boiler Plant Operation Log)
- drain central steam plant boilers
- perform central steam plant boiler draft control operational checks

Those tasks performed by a greater percentage of military incumbents include contingency tasks and the following:

- inspect oil burners
- remove or replace strainers
- measure and cut copper tubing
- test boiler water for sodium sulfates
- inspect and clean filters
- remove or replace insulating materials on pipes other than asbestos insulation

The major users of these personnel are shown below:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	21	23
TAC	18	0
MAC	12	8
AFLC	38	31
ATC	3	31
AFSC	9	0

All members of this group are assigned to bases within CONUS. Sixty-five percent of the military members of this group are in their first enlistment (1-48 months). A job type within this cluster is even more specialized in an area of water treatment functions and, therefore, will be discussed separately.

A. Water Sampling and Testing Personnel (GRP243, N=11). The 11 members of this job type perform an average of 31 tasks. These include:

- test boiler water for causticity
- test boiler water for chlorides or total dissolved solids
- test boiler water for phosphates
- test pH of condensate return
- perform chemical feeding
- test boiler water for sodium sulfates
- mix chemicals required to treat water
- draw boiler water samples
- test boiler water for tannin
- test raw water for hardness

Most of the members representing this group are military personnel (82 percent), with 46 percent in their first enlistment. The small representation of civilian members are in occupational series 4749 and 5402 (each with 9 percent).

IX. SUPERVISORY AND MANAGERIAL CLUSTER (GRP153, N=132). This fairly large group of 132 members represents 6 percent of the survey sample. The military (48 percent) and civilian (52 percent) cluster personnel, on the average, spend over 78 percent of their time on supervisory-type duties, such as planning, organizing, directing, and inspecting. This percentage also includes the amount of time spent conducting informal training, handling forms, and records administration. Typical tasks of this cluster include:

- supervise civilians
- determine work priorities
- plan work assignments
- supervise heating systems specialists (AFSC 54552)
- assign personnel to duty positions
- establish performance standards for subordinates
- schedule leaves or passes
- supervise apprentice heating systems specialists (AFSC 54532)
- counsel personnel on personal or military-related matters

Of the military personnel, 87 percent hold a 7-skill level. Similarly, the civilian members have considerable experience, averaging 285 months in total federal civil service.

Thirty-one percent of the military members were assigned to installations outside CONUS. A comparison across MAJCOMs is as follows:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	27	31
TAC	13	12
MAC	13	15
AFLC	3	25
USAFE	19	0
ATC	7	12
PACAF	7	0
AAC	3	0
AFSC	3	0

There were very few meaningful differences in the jobs performed by military and civilian personnel in terms of tasks. The military members, as expected, perform contingency tasks, and about 50 percent more civilian supervisors and managers write or endorse civilian performance ratings or supervisory appraisals. The following two job types within this cluster warrant further discussion.

A. Boiler Plant Foremen (GRP539, N=69). This group consists of 69 incumbents, both military (38 percent) and civilian (62 percent), who perform supervisory and managerial functions as their primary responsibility. They are titled foremen or work center supervisors and primarily work the day shift. This group is a little more specialized, averaging 91 tasks, compared to the cluster average of 131.

B. OJT Training Personnel (GRP420, N=36). The 36 members of this job type also perform supervisory duties, but distinguish themselves by the amount of time they spend in OJT-structured training. They average the second highest number of tasks (266) in the study, the first being the General Heating Systems Maintenance job type (GRP438, N=691), with an average of 283 tasks. Typical tasks performed by these military (56 percent) and civilian (44 percent) experienced members include:

- determine OJT training requirements
- evaluate OJT trainers
- counsel trainees on training progress
- assign on-the-job training (OJT) trainers
- conduct OJT
- direct or implement OJT programs
- maintain training records, charts, or graphs
- evaluate individuals for specialized training
- plan OJT

A comparison of command representation for military and civilian personnel follows:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	35	25
TAC	10	13
MAC	15	6
AFLC	0	25
USAFE	15	0
ATC	5	13
PACAF	5	0
AFSC	10	0

Analysis was performed to compare the jobs performed by both military and civilian personnel in terms of percent members performing individual tasks. The greatest disparities again were in contingency tasks, with more military members performing, but also in the greater percentage of civilians performing installation and maintenance functions. Excluding contingency tasks, the differences are listed in Table 13.

X. TECHNICAL TRAINING INSTRUCTORS (SPC900, N=5). This independent job type is composed of five technical training school instructors (all military) who average nearly 11 years in the career field. Sixty percent of the group is qualified at the 5-skill level and the remaining 40 percent is qualified at the 7-skill level. These members spend over 60 percent of their time performing duties and tasks directly associated with the training function. Typical tasks are:

- administer tests
- conduct resident classroom training
- score tests
- evaluate progress of resident course students
- develop lesson plans
- evaluate compliance with performance standards
- evaluate training methods, techniques, or programs

XI. CONTINGENCY OR TACTICAL TEAM CLUSTER (GRP030, N=83). The 83 military members of this cluster spend over 70 percent of their time performing contingency or tactical team functions. These members are currently assigned to various PRIME BEEF teams, Reconstitution Teams, Combat Communications and Rapid Runway Repair contingents. Although many of the tasks performed by this cluster are also performed by most of the military members of the groups discussed earlier, these individuals spend the majority of their time in contingency type functions, averaging 49 tasks. Examples of these tasks include:

- practice personal hygiene techniques
- don or doff chemical warfare personal protective clothing
- fire M-16 rifles
- assemble and two AM-2 matting for rapid runway repair

Thirty-one percent of the military members were assigned to installations outside CONUS. A comparison across MAJCOMs is as follows:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	27	31
TAC	13	12
MAC	13	15
AFLC	3	25
USAFE	19	0
ATC	7	12
PACAF	7	0
AAC	3	0
AFSC	3	0

There were very few meaningful differences in the jobs performed by military and civilian personnel in terms of tasks. The military members, as expected, perform contingency tasks, and about 50 percent more civilian supervisors and managers write or endorse civilian performance ratings or supervisory appraisals. The following two job types within this cluster warrant further discussion.

A. Boiler Plant Foremen (GRP539, N=69). This group consists of 69 incumbents, both military (38 percent) and civilian (62 percent), who perform supervisory and managerial functions as their primary responsibility. They are titled foremen or work center supervisors and primarily work the day shift. This group is a little more specialized, averaging 91 tasks, compared to the cluster average of 131.

B. OJT Training Personnel (GRP420, N=36). The 36 members of this job type also perform supervisory duties, but distinguish themselves by the amount of time they spend in OJT-structured training. They average the second highest number of tasks (266) in the study, the first being the General Heating Systems Maintenance job type (GRP438, N=691), with an average of 283 tasks. Typical tasks performed by these military (56 percent) and civilian (44 percent) experienced members include:

- determine OJT training requirements
- evaluate OJT trainers
- counsel trainees on training progress
- assign on-the-job training (OJT) trainers
- conduct OJT
- direct or implement OJT programs
- maintain training records, charts, or graphs
- evaluate individuals for specialized training
- plan OJT

A comparison of command representation for military and civilian personnel follows:

<u>MAJOR COMMAND</u>	<u>MILITARY</u>	<u>CIVILIAN</u>
SAC	35	25
TAC	10	13
MAC	15	6
AFLC	0	25
USAFE	15	0
ATC	5	13
PACAF	5	0
AFSC	10	0

Analysis was performed to compare the jobs performed by both military and civilian personnel in terms of percent members performing individual tasks. The greatest disparities again were in contingency tasks, with more military members performing, but also in the greater percentage of civilians performing installation and maintenance functions. Excluding contingency tasks, the differences are listed in Table 13.

X. TECHNICAL TRAINING INSTRUCTORS (SPC900, N=5). This independent job type is composed of five technical training school instructors (all military) who average nearly 11 years in the career field. Sixty percent of the group is qualified at the 5-skill level and the remaining 40 percent is qualified at the 7-skill level. These members spend over 60 percent of their time performing duties and tasks directly associated with the training function. Typical tasks are:

- administer tests
- conduct resident classroom training
- score tests
- evaluate progress of resident course students
- develop lesson plans
- evaluate compliance with performance standards
- evaluate training methods, techniques, or programs

XI. CONTINGENCY OR TACTICAL TEAM CLUSTER (GRP030, N=83). The 83 military members of this cluster spend over 70 percent of their time performing contingency or tactical team functions. These members are currently assigned to various PRIME BEEF teams, Reconstitution Teams, Combat Communications and Rapid Runway Repair contingents. Although many of the tasks performed by this cluster are also performed by most of the military members of the groups discussed earlier, these individuals spend the majority of their time in contingency type functions, averaging 49 tasks. Examples of these tasks include:

- practice personal hygiene techniques
- don or doff chemical warfare personal protective clothing
- fire M-16 rifles
- assemble and two AM-2 matting for rapid runway repair

tear down, inspect, clean, and reassemble M-16 rifles
prepare personal clothing and equipment for deployment
practice self-protection from extreme weather
erect tents

Twenty-eight percent of these personnel are assigned to installations outside CONUS. The individuals in this cluster represent AFLC (23 percent), MAC (22 percent), TAC (15 percent), ATC and SAC (each with 10 percent), PACAF and AFSC (with 2 percent each). There are two job types within this cluster warranting separate discussions, each containing 11 members.

A. Contingency Technicians (GRP206, N=11). In addition to typical contingency tasks (41 percent of their time), these incumbents spend 15 percent of their time installing heating systems and equipment, maintaining heating system components, and maintaining forced warm air and other heating systems. Combined with the contingency tasks, this job group performs tasks to include:

- measure and cut pipe by machine
- thread pipe by machine
- install black iron steam condensate lines
- inspect steam traps
- install packing
- measure and cut pipe by hand
- install steam heating system valves or fittings

Over 80 percent have earned the 5-skill level; however, 46 percent of these incumbents are in their first enlistment.

B. Contingency Supervisors (GRP430, N=11). This more experienced group, with over 73 percent holding a 7-skill level, performs the supervisory and managerial duties for the tactical teams. In addition to contingency tasks, their job performance includes:

- counsel personnel on personal or military-related matters
- write airman performance reports (APR)
- counsel trainees on training progress
- conduct OJT
- supervise apprentice heating systems specialists (AFSC 54532)
- make entries on AF Forms 561 (Base Civil Engineering Weekly Schedule)
- plan work assignments

They average 78 tasks, slightly more than the technicians' average of 60, indicating a slightly broader job.

TABLE 7

**MILITARY AND CIVILIAN GROUP MEMBERSHIP OF CLUSTERS,
JOB TYPES, AND INDEPENDENT TYPES**

<u>GROUP DESCRIPTION</u>	<u>NUMBER OF MILITARY</u>	<u>NUMBER OF CIVILIAN</u>	<u>NUMBER TOTALS</u>
I. RESIDENTIAL SMALL BUILDINGS AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER	211	56	267
A. ELECTRICAL MAINTENANCE PERSONNEL	4	7	11
II. BOILER AND STEAM HEATING SYSTEMS CLUSTER	359	658	1,017
A. BOILER PLANT OPERATORS	62	249	311
B. BOILER WATER TREATMENT PERSONNEL	11	4	15
C. GENERAL HEATING SYSTEMS MAINTENANCE	286	405	691
III. CONTINGENCY TRAINERS	18	0	18
IV. HIGH TEMPERATURE WATER SYSTEMS OPERATOR CLUSTER	11	39	50
A. FUEL BURNING EQUIPMENT OPERATORS	0	16	16
V. HEAT PLANT OPERATORS	42	63	105
VI. FUEL HEATING SYSTEMS PERSONNEL	11	2	13
VII. BOQ, MULTIHousing HEATING SYSTEMS MAINTENANCE CLUSTER	44	11	55
VIII. WATER TREATMENT CLUSTER	36	13	49
A. WATER SAMPLING AND TESTING PERSONNEL	9	2	11
IX. SUPERVISORY AND MANAGERIAL CLUSTER	64	68	132
A. BOILER PLANT FOREMAN	26	43	69
B. OJT TRAINING PERSONNEL	20	16	36
X. TECHNICAL TRAINING INSTRUCTORS	5	0	5
XI. CONTINGENCY OR TACTICAL TEAM CLUSTER	83	0	83
A. CONTINGENCY TECHNICIANS	11	0	11
B. CONTINGENCY SUPERVISORS	11	0	11

TABLE 7a

**MILITARY AND CIVILIAN GROUP MEMBERSHIP OF CLUSTERS,
JOB TYPES, AND INDEPENDENT TYPES**

<u>GROUP DESCRIPTION</u>	<u>PERCENT OF MILITARY</u>	<u>PERCENT OF CIVILIAN</u>	<u>PERCENT TOTALS</u>
I. RESIDENTIAL SMALL BUILDINGS AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER	79	21	100
A. ELECTRICAL MAINTENANCE PERSONNEL	36	64	100
II. BOILER AND STEAM HEATING SYSTEMS CLUSTER	35	65	100
A. BOILER PLANT OPERATORS	20	80	100
B. BOILER WATER TREATMENT PERSONNEL	73	27	100
C. GENERAL HEATING SYSTEMS MAINTENANCE	41	59	100
III. CONTINGENCY TRAINERS	100	0	100
IV. HIGH TEMPERATURE WATER SYSTEMS OPERATOR CLUSTER	22	78	100
A. FUEL BURNING EQUIPMENT OPERATORS	0	100	100
V. HEAT PLANT OPERATORS	40	60	100
VI. FUEL HEATING SYSTEMS PERSONNEL	85	15	100
VII. BOQ, MULTIHOUSING HEATING SYSTEMS MAINTENANCE CLUSTER	81	19	100
VIII. WATER TREATMENT CLUSTER	73	27	100
A. WATER SAMPLING AND TESTING PERSONNEL	82	18	100
IX. SUPERVISORY AND MANAGERIAL CLUSTER	48	52	100
A. BOILER PLANT FOREMAN	38	62	100
B. OJT TRAINING PERSONNEL	56	44	100
X. TECHNICAL TRAINING INSTRUCTORS	100	0	100
XI. CONTINGENCY OR TACTICAL TEAM CLUSTER	100	0	100
A. CONTINGENCY TECHNICIANS	100	0	100
B. CONTINGENCY SUPERVISORS	100	0	100

TABLE 8

SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	RESIDENTIAL SM BLDGS CLUSTER	ELECT MAINT PERSONNEL	BOILER & STEAM CLUSTER	BOILER PLANT OPERATORS	BOILER WATER TREATMENT PERSONNEL	GENERAL HTG MAINT	CONTG TRAINERS GROUP
NUMBER IN GROUP	267	11	1,017	311	15	691	18
PERCENT OF SAMPLE	13	1	49	15	1	34	1
PERCENT IN CONUS	77	100	96	98	87	96	78
DAFSC DISTRIBUTION							
54532	18	18	6	5	7	6	*
54552	52	18	23	13	60	26	33
54572	9	*	7	2	7	9	67
AVERAGE MILITARY PAYGRADE							
AVERAGE MILITARY TICF (MOS)	E-4	E-4	E-4	E4	E-4	E-4	E-5
AVERAGE TAFMS (MOS)	63	82	119	132	55	116	86
AVERAGE CTFCS**	60	52	81	84	54	81	109
PERCENT IN FIRST ENLISTMENT	164	168	186	186	164	186	*
AVERAGE NUMBER OF TASKS PERFORMED	54	27	18	23	47	20	22
JOB DIFFICULTY INDEX (JDI)	126	142	254	194	152	283	174
	12	14	18	15	13	19	16

* Equals less than .5 percent

** Civilian Total Federal Civil Service (CTFCS)

TABLE 8 (Continued)
SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	HIGH TEMP WATER SYS OPERATORS CLUSTER		FUEL-BURNING EQUIPMENT OPERATORS PERSONNEL		HEAT PLANT OPERATORS CLUSTER		FUEL HEATING SYSTEMS GROUP		BOQ MULTIHOUSING HEATING SYS MAINT CLUSTER		WATER TREATMENT CLUSTER		WATER SAMPLING & TESTING PERSONNEL	
NUMBER IN GROUP	50		16		105		13		73		49		11	
PERCENT OF SAMPLE	2		1		5		1		4		2		1	
PERCENT IN CONUS	96		100		98		39		88		100		100	
DAFSC DISTRIBUTION														
54532	6		*		18		15		37		18		36	
54552	16		*		19		46		32		50		46	
54572	*		*		3		15		8		4		*	
AVERAGE MILITARY PAYGRADE														
AVERAGE MILITARY TICF (MOS)	E-4		*		E-4		E-4		E-4		E-4		E-4	
AVERAGE TAFMS (MOS)	154		178		103		80		53		75		50	
AVERAGE CTFCS**	57		*		69		84		61		60		64	
PERCENT IN FIRST ENLISTMENT	194		208		202		294		171		148		206	
AVERAGE NUMBER OF TASKS PERFORMED	20		*		32		23		48		65		46	
JOB DIFFICULTY INDEX (JDI)	138		123		105		81		57		52		31	
	13		12		11		8		8		8		7	

* Equals less than .5 percent

** Civilian Total Federal Civil Service (CTFCS)

TABLE 8 (Continued)

SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

	SUPERVISORY & MANAGERIAL		BOILER PLANT		OJT TNG		TECH TNG		CONTG OR		CONTG	
	CLUSTER	FOREMAN	PERSONNEL	INSTRS	TAC TEAM	CLUSTER	TECHS	SUPVRS				
NUMBER IN GROUP	132	69	36	5	83	11	11	11				
PERCENT OF SAMPLE	6	3	2	*	4	1	1	1				
PERCENT IN CONUS	86	90	86	100	72	91	91	91				
DAFSC DISTRIBUTION												
54532	2	*	3	*	19	9	*	*				
54552	11	9	14	60	48	82	27	27				
54572	34	29	39	20	28	*	73	73				
AVERAGE MILITARY PAYGRADE												
AVERAGE MILITARY TICF (MOS)	E-6	E-6	E-6	E-6	E-4	E-4	E-5	E-5				
AVERAGE TAFMS (MOS)	161	177	163	130	64	42	92	92				
AVERAGE CTFCS**	155	145	151	138	87	90	99	99				
PERCENT IN FIRST ENLISTMENT	285	285	292	*	*	*	*	*				
AVERAGE NUMBER OF TASKS PERFORMED	6	6	6	*	46	46	36	36				
JOB DIFFICULTY INDEX (JDI)	131	91	266	57	49	60	78	78				
	16	15	21	12	9	8	13	13				

* Equals less than .5 percent

** Civilian Total Federal Civil Service (CTFCS)

TABLE 9

PERCENT CIVILIAN REPRESENTATION WITHIN SPECIALTY JOB GROUPS**

JOB GROUP	CIVILIAN OCCUPATIONAL SERIES						PERCENT OF TOTAL N IN GROUP
	4204	4742	4749	5309	5402	5406	
I. RESIDENTIAL, SMALL BUILDINGS, AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (N=267)	13	*	1	6	*	*	21
A. ELECTRICAL MAINTENANCE PERSONNEL (N=11)	18	*	18	18	*	9	64
II. BOILER AND STEAM HEATING SYSTEMS CLUSTER (N=1,017)	7	5	2	26	24	1	65
A. BOILER PLANT OPERATORS (N=311)	1	9	*	10	58	4	80
B. BOILER WATER TREATMENT PERSONNEL (N=15)	*	*	*	7	20	*	27
C. GENERAL HEATING SYSTEMS MAINTENANCE (N=691)	10	3	2	34	10	*	59
III. CONTINGENCY TRAINERS (N=18)	*	*	*	*	*	*	0
IV. HIGH TEMPERATURE WATER SYSTEMS OPERATOR CLUSTER (N=50)	*	2	*	16	60	*	78
A. FUEL BURNING EQUIPMENT OPERATORS (N=16)	*	*	*	13	88	*	100
V. HEAT PLANT OPERATORS (N=105)	*	*	*	4	51	6	60
VI. FUEL HEATING SYSTEMS PERSONNEL (N=13)	*	*	*	15	*	*	15
VII. BOQ, MULTIHOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (N=73)	6	*	*	4	4	*	19
VIII. WATER TREATMENT CLUSTER (N=36)	2	2	2	2	18	*	27
A. WATER SAMPLING AND TESTING PERSONNEL (N=11)	*	*	9	*	9	*	18
IX. SUPERVISORY AND MANAGERIAL CLUSTER (N=132)	8	2	2	14	26	*	52
A. BOILER PLANT FOREMAN (N=69)	13	3	*	19	28	*	62
B. OJT TRAINING PERSONNEL (N=36)	3	*	6	14	22	*	44
X. TECHNICAL TRAINING INSTRUCTORS (N=5)	*	*	*	*	*	*	0
XI. CONTINGENCY OR TACTICAL TEAM CLUSTER (N=38)	*	*	*	*	*	*	0
A. CONTINGENCY TECHNICIANS (N=11)	*	*	*	*	*	*	0
B. CONTINGENCY SUPERVISORS (N=11)	*	*	*	*	*	*	0

* Denotes less than .5 percent

** Rows and columns may not add up to totals due to rounding and nonresponse

TABLE 10

AVERAGE PERCENT TIME SPENT ON DUTIES BY CLUSTERS AND INDEPENDENT JOB TYPES

DUTIES	RESIDENTIAL SM BLDGS CLUSTER (N=267)	BOILER & STEAM CLUSTER (N=1,017)	CONTG TRAINERS GROUP (N=18)	HIGH TEMP WATER SYS OPERATORS CLUSTER (N=50)	HEAT PLANT OPERATIONS CLUSTER (N=105)	FUEL HEAT SYSTEMS GROUP (N=13)
A ORGANIZING AND PLANNING	1	1	5	1	1	1
B DIRECTING AND IMPLEMENTING	1	1	7	2	1	2
C INSPECTING AND EVALUATING	*	1	4	*	*	1
D TRAINING	1	1	8	1	1	1
E PERFORMING ADMINISTRATIVE FUNCTIONS	1	1	2	2	3	1
F INSTALLING HEATING SYSTEMS AND EQUIPMENT	20	13	10	10	5	30
G MAINTAINING FORCED WARM AIR AND OTHER HEATING SYSTEMS	12	6	6	6	3	16
H MAINTAINING HEATING CONTROL SYSTEMS	4	5	4	4	2	2
I MAINTAINING HEATING ELECTRICAL SYSTEMS	7	5	5	4	2	5
J MAINTAINING PNEUMATIC SYSTEMS	1	2	1	6	2	1
K MAINTAINING HEATING SYSTEM COMPONENTS	16	13	8	20	9	13
L MAINTAINING AND OPERATING FUEL BURNING EQUIPMENT	5	5	6	9	6	3
M MAINTAINING STEAM HEATING SYSTEMS	11	16	10	2	18	10
N OPERATING STEAM HEATING SYSTEMS	2	3	2	*	7	1
O MAINTAINING HIGH TEMPERATURE WATER HEATING SYSTEMS	1	2	1	14	2	1
P OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	*	1	*	6	1	*
Q MAINTAINING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	4	3	2	*	*	1
R OPERATING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	3	3	3	*	1	1
S MAINTAINING CENTRAL STEAM PLANTS	*	6	1	*	11	1
T OPERATING CENTRAL STEAM PLANTS	*	3	1	*	8	*
U MAINTAINING FUEL AREAS	*	*	*	1	1	*
V PERFORMING WATER TREATMENT FUNCTIONS	1	4	2	8	12	1
W MAINTAINING AND SERVICING GAS DISTRIBUTION SYSTEMS	1	2	*	*	1	*
X MAINTAINING SOLAR HEATING SYSTEMS	*	1	*	*	*	*
Y PERFORMING CONTINGENCY OR TACTICAL TEAM FUNCTIONS	7	2	13	3	4	5

* Denotes Less than .5 percent

TABLE 10 (Continued)

AVERAGE PERCENT TIME SPENT ON DUTIES BY CLUSTERS AND INDEPENDENT JOB TYPES

DUTIES	BOQ MULTIHOUSING HEATING SYS MAINT CLUSTER (N=55)	WATER TREATMENT CLUSTER (N=49)	SUPERVISORY & MANAGERIAL CLUSTER (N=132)	TECH TNG INSTRS (N=5)	CONTG TAC TEAM CLUSTER (N=83)
A ORGANIZING	1	1	20	1	4
B DIRECTING AND IMPLEMENTING	2	2	20	10	5
C INSPECTING AND EVALUATING	1	*	16	4	2
D TRAINING	1	1	12	43	4
E PERFORMING ADMINISTRATIVE FUNCTIONS	1	5	6	*	3
F INSTALLING HEATING SYSTEMS AND EQUIPMENT	30	2	3	*	9
G MAINTAINING FORCED WARM AIR AND OTHER HEATING SYSTEMS	16	2	2	2	7
H MAINTAINING HEATING CONTROL SYSTEMS	2	2	2	4	2
I MAINTAINING HEATING ELECTRICAL SYSTEMS	5	2	1	13	4
J MAINTAINING PNEUMATIC SYSTEMS	1	1	1	*	1
K MAINTAINING HEATING SYSTEM COMPONENTS	13	3	2	4	5
L MAINTAINING AND OPERATING FUEL BURNING EQUIPMENT	3	3	2	7	4
M MAINTAINING STEAM HEATING SYSTEMS	10	6	3	2	4
N OPERATING STEAM HEATING SYSTEMS	1	5	1	*	1
O MAINTAINING HIGH TEMPERATURE WATER HEATING SYSTEMS	1	1	1	*	*
P OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	*	1	*	2	*
Q MAINTAINING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	1	*	*	*	1
R OPERATING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	1	1	*	2	2
S MAINTAINING CENTRAL STEAM PLANTS	1	5	*	2	*
T OPERATING CENTRAL STEAM PLANTS	*	7	1	1	1
U MAINTAINING FUEL AREAS	*	1	*	*	*
V PERFORMING WATER TREATMENT FUNCTIONS	1	35	1	2	1
W MAINTAINING AND SERVICING GAS DISTRIBUTION SYSTEMS	*	2	*	1	*
X MAINTAINING SOLAR HEATING SYSTEMS	*	*	*	*	*
Y PERFORMING CONTINGENCY OR TACTICAL TEAM FUNCTIONS	5	12	4	*	40

* Denotes Less than .5 percent

TABLE 11

EXAMPLES OF TASKS WHICH BEST DIFFERENTIATE THE JOB PERFORMED BY MILITARY
AND CIVILIAN PERSONNEL IN THE RESIDENTIAL, SMALL BUILDINGS, AND HOUSING HEATING SYSTEMS
MAINTENANCE CLUSTER (GRP255)

TASKS*	PERCENT MEMBERS PERFORMING		DIFFERENCE
	MILITARY (N=211)	CIVILIAN (N=56)	
I257 REMOVE OR REPLACE TRANSFORMERS	60	21	+39
I247 INSPECT TRANSFORMERS	52	18	+34
L339 INSPECT FUEL LINES OR FITTINGS	73	43	+30
I244 INSPECT MOTORS	78	48	+30
H230 REMOVE OR REPLACE ELECTRICAL WIRING ON CONTROLS	58	28	+30
I262 TEST TRANSFORMERS	59	30	+29
I229 REMOVE OR TEST ELECTRICAL CONTROLS	59	30	+29
.	.	.	.
.	.	.	.
.	.	.	.
G135 BALANCE HEATING SYSTEMS	31	73	-42
M400 REBUILD STEAM TRAPS	29	68	-39
K523 REMOVE OR REPLACE PACKING ON CENTRIFUGAL WATER PUMPS	30	64	-34
N421 ADJUST STEAM HEATING SYSTEM STEAM REGULATING VALVES	23	57	-34
K321 REMOVE OR REPLACE MECHANICAL WATER PUMP SEALS	37	71	-34
M388 INSPECT STEAM HEATING SYSTEM EXPANSION JOINTS	16	46	-31
K332 SILVER BRAZE LINES OR FITTINGS	13	41	-28
F175 INSTALL STEAM HEATING SYSTEM VALVES OR FITTINGS	59	86	-27
M415 REMOVE OR REPLACE STEAM HEATING SYSTEM VALVES OR FITTINGS OTHER THAN SAFETY OR PRESSURE RELIEF	39	66	-27
K330 REMOVE OR REPLACE WATER REGULATING VALVES	36	63	-27
G190 INSPECT HEAT EXCHANGERS	52	79	-27
G196 MIX AND APPLY POWDERED INSULATION	42	68	-26
F147 INSTALL HEAT EXCHANGERS	40	66	-26
M413 REMOVE OR REPLACE STEAM HEATING SYSTEM PRESSURE RELIEF VALVES	48	73	-25

* Excluding contingency tasks performed primarily by military personnel

TABLE 12

EXAMPLES OF TASKS WHICH BEST DIFFERENTIATE THE JOB PERFORMED BY MILITARY
AND CIVILIAN PERSONNEL IN THE BOILER WATER TREATMENT JOB TYPE (GRP418)

TASKS*	PERCENT MEMBERS PERFORMING			DIFFERENCE
	MILITARY (N=11)	CIVILIAN (N=4)		
I251 REMOVE OR REPLACE ELECTRIC MOTORS	73	0		+73
I252 REMOVE OR REPLACE FUSES	64	0		+64
I258 RESET CIRCUIT BREAKERS	64	0		+64
K309 REMOVE ASBESTOS INSULATION ON DUCTS OR PIPES	64	0		+64
I244 INSPECT MOTORS	82	25		+57
B39 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	55	0		+55
F118 INSTALL AIR BLEED VALVES	55	0		+55
H208 ADJUST ELECTRICAL THERMOSTATS OR PRESSURE SWITCHES	55	0		+55
.	.	.		.
.	.	.		.
I246 INSPECT TIMERS	.	.		.
F179 INSTALL TIMERS	0	75		-75
M406 REMOVE OR REPLACE DEMINERALIZERS OR WATER SOFTENERS	0	75		-75
V556 TEST SPECIFIC GRAVITY OR BRINE SOLUTIONS	27	100		-73
L354 PERFORM OIL STORAGE TANK PREVENTIVE MAINTENANCE	9	75		-66
M372 DRAIN DEMINERALIZERS OR WATER SOFTENERS	9	75		-66
L344 INSPECT OIL STORAGE TANKS	36	100		-64
L340 INSPECT GAS BURNERS	36	100		-64
F153 INSTALL OIL BURNERS	36	100		-64
M400 REBUILD STEAM TRAPS	36	100		-64
M399 REBUILD FEED WATER CONTROLS (MCDONNELL-MILLER)	18	75		-57
M387 INSPECT STEAM HEATING SYSTEM DEAERATORS	18	75		-57
	18	75		-57

* Excluding contingency tasks performed primarily by military personnel

TABLE 13

EXAMPLES OF TASKS WHICH BEST DIFFERENTIATE THE JOB PERFORMED BY MILITARY
AND CIVILIAN PERSONNEL IN THE OJT TRAINING PERSONNEL JOB TYPE (GRP420)

TASKS*	PERCENT MEMBERS PERFORMING		DIFFERENCE
	MILITARY (N=20)	CIVILIAN (N=16)	
N418 ADJUST DEMINERALIZERS OR WATER SOFTENERS	15	56	-41
J270 CALIBRATE PNEUMATIC CONTROLS	20	63	-43
J272 INSPECT COMPRESSOR OIL LEVELS	20	63	-43
J276 REMOVE OR REPLACE PNEUMATIC CONTROLS	25	69	-44
K317 REMOVE OR REPLACE GAUGES	50	94	-44
F152 INSTALL MOTOR STARTERS	30	75	-45
K327 REMOVE OR REPLACE STEAM OR TEMPERATURE RECORDING EQUIPMENT	10	56	-46
N420 ADJUST STEAM HEATING SYSTEM FEED WATER REGULATORS	35	81	-46
N425 PERFORM STEAM HEATING SYSTEM BOILER DRAFT CONTROL OPERATIONAL CHECKS	35	81	-46
I250 REMOVE OR REPLACE CIRCUIT BREAKERS	15	63	-48
C68 WRITE CIVILIAN PERFORMANCE RATINGS OR SUPERVISORY APPRAISALS	40	88	-48
J215 ANALYZE PRESSURE OR TEMPERATURE READINGS	40	88	-48
L282 ADJUST VALVE AND DAMPER LINKAGES	40	88	-48
M376 INSPECT AND CLEAN STEAM HEATING SYSTEM SMOKESTACKS	25	75	-50
M389 INSPECT STEAM HEATING SYSTEM STEAM INDICATING AND RECORDING EQUIPMENT	25	75	-50
M387 INSPECT STEAM HEATING SYSTEM DEAERATORS	10	63	-53
I246 INSPECT TIRES	40	94	-54
F173 INSTALL STARTING OR RUNNING CAPACITORS	20	75	-55
I256 REMOVE OR REPLACE TIMERS	20	75	-55
M388 INSPECT STEAM HEATING SYSTEM EXPANSION JOINTS	20	75	-55
J273 ISOLATE PNEUMATIC CONTROL MALFUNCTIONS	15	75	-60
I240 ADJUST TIMERS	20	81	-61
H228 REMOVE OR REPLACE CENTRAL HEATING PLANT CONTROL PANEL COMPONENTS	10	75	-65
J266 ADJUST PNEUMATIC CONTROLS	15	81	-66

Comparison of Specialty Job Groups

After identifying jobs based on differences in tasks performed and time spent on them, a comparison of some further differences in the groups helps develop a better understanding of the career ladder structure.

The Job Difficulty Index (JDI), which is based on the number of tasks performed and the relative difficulty of these tasks with respect to time spent (see Task Factor Administration section), can be used to compare the complexity of career ladder jobs. A rank ordering of all job groups with respect to job difficulty may be seen in Table 14. For example, the OJT training personnel have the highest JDI (21) for any job type or independent job type. Of the clusters, Boiler and Steam Heating Systems Cluster had the highest JDI (18), while the Supervisory and Managerial Cluster and Contingency Trainers were the next highest, both with a JDI of 16. The jobs with the lowest JDI were the Water Sampling and Testing Personnel (7). This job, as was mentioned in the job description, is very limited, averaging just 31 tasks, with 46 percent of the members in their first enlistment. Other jobs with fairly low JDI are BOQ, Multihousing Heating Systems Maintenance Cluster, Water Treatment Cluster, Fuel Heating Systems Group, and Contingency Technicians, each with a JDI of 8, and the Contingency or Tactical Team Cluster with a JDI of 9. All of these jobs are fairly limited, averaging less than 100 tasks and, with the exception of the Fuel Heating Systems Group, include the highest percentage of first-term airmen. All other jobs are very near the average JDI of 13.

In addition to reviewing the functions of each job, it is useful to compare the job groups in terms of background characteristics and job attitudes of the job incumbents. Table 15 presents career ladder job group data pertaining to job satisfaction indicators, such as expressed job interest, sense of accomplishment, perceived utilization of talents and training, and reenlistment intentions.

In most of the groups identified, members indicate a high amount of job interest, with 9 of the 11 groups discussed showing over 60 percent responding positively. The two groups where less than 60 percent of the incumbents reported positive job interest also had less than 60 percent responding positively to sense of accomplishment. Analysis of the composition of these two jobs shows they have low JDIs and high percent first-term personnel.

Perceived utilization of talents and training was high for the job groups overall, with all of the job groups having greater than 60 percent responding positively.

The military reenlistment intentions indicator looks good as well. Only two groups, High Temperature Water System Operators Cluster and Heat Plant Operators Cluster, have less than 60 percent members responding positively.

TABLE 14
JOB DIFFICULTY INDEX (JDI) FOR
SPECIALTY GROUPS

SPECIALTY GROUPS	JDI*
IX.B OJT TRAINING PERSONNEL	21
II.C GENERAL HEATING SYSTEMS MAINTENANCE	19
II. BOILER AND STEAM HEATING SYSTEMS CLUSTER	18
IX. SUPERVISORY AND MANAGERIAL CLUSTER	16
III. CONTINGENCY TRAINERS	16
II.A BOILER PLANT OPERATORS	15
IX.A BOILER PLANT FOREMEN	15
I.A ELECTRICAL MAINTENANCE PERSONNEL	14
IV. HIGH TEMPERATURE WATER SYSTEMS OPERATORS CLUSTER	13
II.B BOILER WATER TREATMENT PERSONNEL	13
IX.B CONTINGENCY SUPERVISORS	13
I. RESIDENTIAL, SMALL BUILDING HEATING SYSTEMS MAINTENANCE CLUSTER	12
IV.A FUEL BURNING EQUIPMENT OPERATIONS PERSONNEL	12
X. TECHNICAL TRAINING INSTRUCTORS	12
V. HEAT PLANT OPERATORS CLUSTER	11
XI. CONTINGENCY OR TACTICAL TEAM CLUSTER	9
VII. BOQ, MULTIHousing HEATING SYSTEMS MAINTENANCE CLUSTER	8
VIII. WATER TREATMENT CLUSTER	8
XI. FUEL HEATING SYSTEMS GROUP	8
XI.A CONTINGENCY TECHNICIANS	8
VIII.A WATER SAMPLING AND TESTING PERSONNEL	7

* Average JDI - 13.00

TABLE 15

COMPARISONS OF JOB SATISFACTION INDICATORS BY CAREER LADDER CLUSTERS AND INDEPENDENT JOB TYPES
(Percent Members Responding)**

	RESIDENTIAL SM BLDGS CLUSTER (N=267)	BOILER & STEAM CLUSTER (N=1,017)	CONTINGENCY TRAINERS GROUP (N=18)	HIGH TEMP WATER SYS OPERATORS CLUSTER (N=50)	HEAT PLANT OPERATORS CLUSTER (N=105)
EXPRESSED JOB INTEREST:					
DULL	7	5	11	6	7
SO-SO	11	9	11	18	11
INTEREST'NG	81	84	78	74	80
PERCEIVED UTILIZATION OF TALENTS:					
LITTLE OR NOT AT ALL	11	10	22	8	22
FAIRLY WELL TO PERFECTLY	89	89	78	90	76
PERCEIVED UTILIZATION OF TRAINING:					
LITTLE OR NOT AT ALL	14	10	22	4	16
FAIRLY WELL TO PERFECTLY	86	89	78	96	82
SENSE OF ACCOMPLISHMENT:					
DISSATISFIED	9	9	22	12	13
NEUTRAL	12	10	*	18	12
SATISFIED	78	80	78	68	71
REENLISTMENT INTENTIONS:					
RETIRE	1	4	6	*	5
NO, PROBABLY NO	28	23	6	46	36
YES, PROBABLY YES	69	72	89	<u>55</u>	57

* Less than .5 percent responding

** Columns may not add to 100 percent due to no response or rounding

TABLE 15 (Continued)

COMPARISONS OF JOB SATISFACTION INDICATORS BY CAREER LADDER CLUSTERS AND INDEPENDENT JOB TYPES
(Percent Members Responding)**

	FUEL HEATING SYSTEMS GROUP (N=13)	BOQ, MULTIHOUSING HEAT SYS MAINT CLUSTER (N=55)	WATER TREATMENT CLUSTER (N=49)	SUPERVISORY AND MANAGERIAL CLUSTER (N=132)	TECHNICAL TRAINING INSTRUCTORS (N=5)	CONTINGENCY TAC TEAM CLUSTER (N=83)
EXPRESSED JOB INTEREST:						
DULL	8	1	22	3	*	18
SO-SO	15	18	16	8	*	23
INTERESTING	69	81	57	89	100	59
PERCEIVED UTILIZATION OF TALENTS:						
LITTLE OR NOT AT ALL	15	14	37	7	*	36
FAIRLY WELL TO PERFECTLY	85	86	63	92	100	64
PERCEIVED UTILIZATION OF TRAINING:						
LITTLE OR NOT AT ALL	8	14	22	6	*	37
FAIRLY WELL TO PERFECTLY	92	85	77	93	100	60
SENSE OF ACCOMPLISHMENT:						
DISSATISFIED	8	11	20	10	20	25
NEUTRAL	8	15	22	4	*	16
SATISFIED	85	73	57	86	80	59
REENLISTMENT INTENTIONS:						
RETIRE	10	2	*	21	*	8
NO, PROBABLY NO	20	36	38	5	*	27
YES, PROBABLY YES	70	62	62	73	100	65

* Less than .5 percent responding

** Columns may not add to 100 percent due to no response or rounding

Comparison of Military and Civilian Group Membership

Specialty job groups were compared in terms of military and civilian group membership as well. One of the more interesting items in Table 8 is in the difference in total months of service between military and civilian members found within the same specialty group. Civilian members tend to have been in Government service much longer than their military counterparts. For instance, in the Boiler and Steam Heating Systems Cluster, the largest group in the study, the civilian average CTFCS is 186 months, while military average TAFMS is 81 months--less than half the time of civilian personnel. This same trend, in varying degrees, can be seen across all groups. Table 8 shows which groups are most senior by average paygrade and skill level. The supervisory cluster clearly contains the most experienced group of personnel, with members averaging a paygrade of E-6 and a 7-skill level. The civilian personnel in this cluster also average the highest CTFCS (285 months) in the study. Conversely, those groups containing the most first-enlistment personnel and civilians with less CTFCS are the Water Treatment Cluster; Residential, Small Buildings Heating Systems Maintenance Cluster; and the BOQ, Multihousing Heating Systems Maintenance Cluster. These groups contain close to 50 percent first-enlistment personnel (1-48 months), and civilian personnel with an average of 155 months CTFCS.

As stated earlier in this section, it is also important to consider the military-civilian mix for each specialty group. Table 7 shows the number of military and civilian personnel in each group. Notice from the table that there are three job groups containing only military personnel: Contingency Trainers, Technical School Instructors, and the Contingency or Tactical Team Cluster. The Fuel Heating Systems Personnel and the Residential, Small Buildings and Housing Heating Systems Maintenance Cluster also had a high percentage of military members. Job types containing a high percent of civilian personnel include the Boiler Plant Operators (80 percent) and the Fuel Burning Equipment Operators (100 percent). The Supervisory and Managerial Cluster, OJT Training Personnel, and the General Heating Systems Maintenance group were the groups closest to having a 50/50 split or to show little imbalance between military and civilian members.

A task analysis was performed on each of the identified specialty jobs to determine where the greatest differences were in the job performed by military personnel and the job performed by civilian counterparts. The findings indicate that in the majority of groups, other than in members or percentages of military or civilian members in each group, very few differences existed. For instance, the Boiler Plant Operators job type, which was found within the Boiler and Steam Heating Systems Cluster, was 80 percent civilian and had the largest civilian population of any group in the study; however, the actual task differences were very few. There were variations on the average number of tasks performed, as well as on the amount of time spent on those tasks, and military members, in some cases, were performing more tasks overall than their civilian counterparts. This appears to be because civilians are hired for a specific job and overlap very little into other job areas, while military members may be asked to perform a number of tasks not associated with their primary duties (contingency duties, special projects, etc). This finding is not unusual or unexpected. There were, however, several task differences in three of the groups: the Residential, Small Buildings, and Housing Heating Systems Maintenance Cluster (GRP255) showed differences in the percent military

and civilian personnel performing some tasks. These tasks are listed in Table 11. Even larger differences were found in the Boiler Water Treatment job type (GRP418) within the Boiler and Steam Heating Cluster (GRP376). A greater percent of military members of this group, other than the group's common tasks, perform electrical maintenance-type tasks, where the civilian personnel have more percent members performing oil-related tasks (see Table 12). The third group, where several differences are apparent, is in the OJT Training Personnel job type (GRP420), within the Supervisory and Managerial Cluster (GRP153). Excluding military contingency task differences, there were several tasks with more percent civilian members performing than military. These tasks are listed in Table 13, and seem to involve installing, inspecting, and adjusting steam system-related components. Therefore, any task list which describes a military member's job would include all those tasks which also describe the job of a civilian counterpart and more, except in the three groups just mentioned.

In the previous section, job satisfaction indicators were compared across specialty job groups, including military and civilian responses combined. Further analysis of job satisfaction within each group for military members and civilian counterparts separately revealed a slightly different picture (see Table 16). The indicators generally are high for both military and civilian incumbents in job groups with only a few indicators having less than 60 percent members responding positively, as mentioned in the previous section.

Less than 60 percent of the military members in the Water Treatment Cluster responded positively to job interest, utilization of talents, and sense of accomplishment, while the only low indicator for their civilian counterparts was in job interest. The lowest indicator in the study was for military members' job interest in the High Temperature Water System Operators Cluster, with just 46 percent of the members reporting their job to be interesting. Military members in the Heat Plant Operations Cluster reported low sense of accomplishment.

Overall, the comparison of job satisfaction data between military and civilian incumbents shows civilians to be reasonably satisfied, regardless of job. While the same is generally true for military members, there are a few satisfaction indicators that are low for some jobs.

TABLE 16

COMPARISONS OF JOB SATISFACTION INDICATORS FOR MILITARY AND CIVILIAN PERSONNEL SEPARATELY
WITHIN CAREER LADDER CLUSTERS AND INDEPENDENT JOB TYPES
(Percent Members Responding)**

	RESIDENTIAL SMALL BLDGS CLUSTER		BOILER & STEAM CLUSTER		HIGH TEMP WATER SYS OPERATORS CLUSTER		HEAT PLANT OPERATORS CLUSTER		FUEL HEAT SYSTEMS GROUP	
	MIL (N=211)	CIV (N=56)	MIL (N=359)	CIV (N=658)	MIL (N=11)	CIV (N=39)	MIL (N=42)	CIV (N=63)	MIL (N=11)	CIV (N=2)
EXPRESSED JOB INTEREST:										
DULL	7	5	5	4	18	3	7	6	10	*
SO-SO	13	5	12	8	27	15	14	10	20	*
INTERESTING	79	89	82	86	46	82	74	84	70	50
PERCEIVED UTILIZATION OF TALENTS:										
LITTLE OR NOT AT ALL	12	7	14	8	27	3	29	18	20	*
FAIRLY WELL	88	91	86	91	64	97	67	83	80	100
PERCEIVED UTILIZATION OF TRAINING:										
LITTLE OR NOT AT ALL	14	11	11	9	9	3	19	14	10	*
FAIRLY WELL	86	88	89	89	91	97	76	86	90	100
SENSE OF ACCOMPLISHMENT:										
DISSATISFIED	10	9	11	8	18	10	19	10	10	*
NEUTRAL	12	11	11	10	9	21	19	8	*	50
SATISFIED	78	79	78	81	64	69	55	83	90	50
REENLISTMENT INTENTIONS:										
RETIRE	1	*	4	*	*	*	5	*	10	*
NO, PROBABLY NO	28	*	23	*	46	*	36	*	20	*
YES, PROBABLY YES	69	*	72	*	55	*	57	*	70	*

* Less than .5 percent resending

** Columns may not add to 100 percent due to no response or rounding

TABLE 16 (Continued)

COMPARISONS OF JOB SATISFACTION INDICATORS FOR MILITARY AND CIVILIAN PERSONNEL SEPARATELY
WITHIN CAREER LADDER CLUSTERS AND INDEPENDENT JOB TYPES
(Percent Members Responding)**

	MULTIHOUSING HEATING SYSTEM MAINT CLUSTER		WATER TREATMENT CLUSTER		SUPERVISORY & MANAGERIAL CLUSTER	
	MIL (N=59)	CIV (N=14)	MIL (N=36)	CIV (N=13)	MIL (N=64)	CIV (N=68)
<u>EXPRESSED JOB INTEREST:</u>						
DULL	2	*	27	15	5	2
SO-SO	19	7	18	15	11	4
INTERESTING	79	93	56	54	82	94
<u>PERCEIVED UTILIZATION OF TALENTS:</u>						
LITTLE OR NOT AT ALL	16	*	41	31	10	3
FAIRLY WELL	85	100	59	69	89	97
<u>PERCEIVED UTILIZATION OF TRAINING:</u>						
LITTLE OR NOT AT ALL	14	7	27	15	8	3
FAIRLY WELL	85	93	74	85	90	97
<u>SENSE OF ACCOMPLISHMENT:</u>						
DISSATISFIED	12	7	27	8	13	6
NEUTRAL	19	*	27	15	7	2
SATISFIED	67	93	47	77	79	93
<u>REENLISTMENT INTENTIONS:</u>						
RETIRE	2	*	*	*	21	*
NO, PROBABLY NO	36	*	38	*	5	*
YES, PROBABLY YES	62	*	62	*	73	*

* Less than .5 percent responding

** Columns may not add to 100 percent due to no response or rounding

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with analysis of the career ladder structure, is an important part of each occupational analysis. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information is also used to evaluate how well career ladder documents, such as AFR 39-1 specialty descriptions and the specialty training standard (STS), reflect what career ladder personnel are actually doing in the field. The distribution of skill level groups across the career ladder job clusters and independent job types is displayed in Table 17, while Table 18 presents the relative percent time spent on each duty across the skill level groups. A typical pattern of progression is found, with personnel spending more of their relative time on duties involving supervisory and administrative tasks (Duties A, B, C, D, and E) as they progress to the 7-skill level. Specific skill level groups are discussed below. Since a comparison of duty and task performance between DAFSCs 54532 and 54552 indicated no significant difference in the jobs they performed, they will be discussed as one group.

Skill Level Descriptions

DAFSCs 54532/54552. Representing 78 percent (845 members) of the 545X2 military survey sample, 3- and 5-skill level personnel performed an average of 138 tasks. Performing a highly technical job, members spent the largest percent of their time on duties involving installing heating systems and equipment, maintaining heating system components and steam heating systems, and maintaining forced warm air and other heating systems. Within this group, the 5-skill level personnel average slightly more tasks (145) than the 3-skill level personnel (115) because they perform some supervisory tasks in addition to the technical tasks. Typical general heating system specialist tasks performed by this group are presented in Table 19.

DAFSC 54572. The 7-skill level personnel represent 20 percent (218 members) of the 545X2 military survey sample and perform an average of 150 tasks. Table 20 displays examples of tasks performed by DAFSC 54572. This table, along with data showing a significant amount of time spent (34 percent) performing inspecting, evaluating, organizing, planning, directing, implementing, and performing administrative and training functions, shows that 7-skill level personnel clearly have the greatest responsibility for supervision, management, and training of the 3- and 5-skill level personnel. Tasks which differentiate the jobs of 3- and 5-skill level personnel from 7-skill level personnel are shown in Table 21.

Summary

Career ladder progression is well defined, with personnel at the 3- and 5-skill level spending the majority of their time performing technical tasks. Most of these personnel are found in clusters and independent job types involving installation and maintenance functions. While 7-skill level personnel perform some technical tasks, they spend the majority of their time performing supervisory and administrative type functions. As expected, almost all of these 7-skill level personnel are represented in the Contingency Trainers, Supervisory and Managerial, and Technical Training School Instructors job groups.

TABLE 17
DISTRIBUTION OF DAFSC GROUP MEMBERS
ACROSS CAREER LADDER CLUSTERS AND INDEPENDENT JOB TYPES

JOB GROUP TITLE	PERCENT MEMBERS	
	DAFSC 54532/52 (N=845)	DAFSC 54572 (N=218)
I. RESIDENTIAL, SMALL BLDGS AND HOUSING HEATING SYSTEMS MAINTENANCE CLUSTER (N=267)	27	13
II. BOILER AND STEAM HEATING SYSTEMS CLUSTER (N=1,017)	42	37
III. CONTINGENCY TRAINERS (N=18)	1	6
IV. HIGH TEMPERATURE WATER SYSTEM OPERATOR CLUSTER (N=50)	2	*
V. HEAT PLANT OPERATORS (N=105)	6	2
VI. FUEL HEATING SYSTEMS PERSONNEL (N=13)	1	1
VII. BOQ, MULTIHousing HEATING SYSTEMS MAINTENANCE CLUSTER (N=55)	6	2
VIII. WATER TREATMENT CLUSTER (N=49)	5	1
IX. SUPERVISORY AND MANAGERIAL CLUSTER (N=132)	2	24
X. TECHNICAL TRAINING INSTRUCTORS (N=5)	*	2
XI. CONTINGENCY OR TACTICAL TEAM CLUSTER (N=83)	<u>8</u>	<u>12</u>
	100	100

* Denotes less than .5 percent

TABLE 18

RELATIVE PERCENT TIME SPENT ON DUTIES BY DAFSC GROUPS**

DUTIES	DAFSC 54532 (N=239)	DAFSC 54552 (N=606)	DAFSC 54572 (N=218)
A ORGANIZING AND PLANNING	1	2	8
B DIRECTING AND IMPLEMENTING	1	3	9
C INSPECTING AND EVALUATING	*	1	7
D TRAINING	1	2	7
E PERFORMING ADMINISTRATIVE FUNCTIONS	1	2	3
F INSTALLING HEATING SYSTEMS AND EQUIPMENT	17	14	9
G MAINTAINING FORCED WARM AIR AND OTHER HEATING SYSTEMS	10	9	6
H MAINTAINING HEATING CONTROL SYSTEMS	4	4	3
I MAINTAINING HEATING ELECTRICAL SYSTEMS	6	6	4
J MAINTAINING PNEUMATIC SYSTEMS	2	*	1
K MAINTAINING HEATING SYSTEM COMPONENTS	13	11	8
L MAINTAINING AND OPERATING FUEL BURNING EQUIPMENT	5	5	4
M MAINTAINING STEAM HEATING SYSTEMS	11	11	8
N OPERATING STEAM HEATING SYSTEMS	2	2	2
O MAINTAINING HIGH TEMPERATURE WATER HEATING SYSTEMS	2	2	1
P OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	1	1	*
Q MAINTAINING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	3	3	2
R OPERATING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	2	3	2
S MAINTAINING CENTRAL STEAM PLANTS	3	3	2
T OPERATING CENTRAL STEAM PLANTS	2	2	1
U MAINTAINING FUEL AREAS	*	*	*
V PERFORMING WATER TREATMENT FUNCTIONS	5	4	2
W MAINTAINING AND SERVICING GAS DISTRIBUTION SYSTEMS	1	1	1
X MAINTAINING SOLAR HEATING SYSTEMS	*	1	*
Y PERFORMING CONTINGENCY OR TACTICAL TEAM FUNCTIONS	9	11	11

* Denotes less than .5 percent

** Columns may not add to 100 percent due to rounding

TABLE 19
REPRESENTATIVE TASKS PERFORMED BY DAFSC
54532/52 PERSONNEL

TASK	PERCENT MEMBERS PERFORMING (N=845)
G202 THREAD PIPE BY MACHINE	77
Y638 FIRE M-16 RIFLES	77
G194 MEASURE AND CUT PIPE BY MACHINE	76
G197 MEASURE AND CUT PIPE BY HAND	71
G206 THREAD PIPE BY HAND	70
G197 MEASURE AND CUT COPPER TUBING	70
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	69
F124 INSTALL CHECK VALVES	67
Y682 PUT ON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	66
L344 INSPECT MOTORS	66
K312 REMOVE OR REPLACE CHECK VALVES	63
F129 INSTALL CIRCULATING PUMPS	62
I252 REMOVE OR REPLACE FUSES	62
L339 INSPECT FUEL LINES OR FITTINGS	61
F145 INSTALL GAUGES	61
I251 REMOVE OR REPLACE ELECTRIC MOTORS	61
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	60
F136 INSTALL ELECTRIC MOTORS	60
F121 INSTALL BOILER GAUGE GLASSES	60

Average number of tasks performed - 138

TABLE 20
REPRESENTATIVE TASKS PERFORMED BY
DAFSC 54572 PERSONNEL

TASK	PERCENT MEMBERS PERFORMING (N=845)
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	76
Y638 FIRE M-16 RIFLES	75
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	69
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	67
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	66
D74 CONDUCT OJT	66
G194 MEASURE AND CUT PIPE BY MACHINE	64
G207 THREAD PIPE BY MACHINE	63
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	62
Y633 DON OR DOFF CHEMICAL WARFARE PROTECTIVE CLOTHING	62
G193 MEASURE AND CUT PIPE BY HAND	62
G206 THREAD PIPE BY HAND	62
A4 DETERMINE WORK PRIORITIES	60
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	60
G192 MEASURE AND CUT COPPER TUBING	60

Average number of tasks performed - 150

TABLE 21

**TASKS WHICH BEST DIFFERENTIATE BETWEEN
3-/5- AND 7-SKILL LEVEL PERSONNEL
(PERCENT MEMBERS PERFORMING)**

TASKS	54532/52 (N=845)	54572 (N=218)	DIFFERENCE
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	24	76	-52
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	19	67	-48
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY- RELATED MATTERS	24	69	-45
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	14	56	-42
A22 SCHEDULE LEAVES OR PASSES	9	51	-41
A2 ASSIGN SPONSORS FOR NEWLY ASSIGNED PERSONNEL	11	52	-41
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	20	60	-40
A4 DETERMINE WORK PRIORITIES	21	60	-39
D91 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	18	57	-39
C51 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSIFICATION, OR SPECIAL AWARDS	11	49	-38
A11 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	14	51	-38
D86 EVALUATE OJT TRAINEES	17	54	-37
B42 SUPERVISE CIVILIANS	9	46	-37
C64 INDORSE AIRMAN PERFORMANCE REPORTS (APR)	10	47	-37
D98 VERIFY CDC COURSE COMPLETIONS	14	50	-36
A3 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT, OR SUPPLIES	14	49	-35
D79 DETERMINE OJT TRAINING REQUIREMENTS	12	47	-35
D74 CONDUCT OJT	31	66	-35
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	27	62	-35
B47 WRITE CORRESPONDENCE	10	43	-33

Average number of tasks performed by 54532/52 personnel - 138

Average number of tasks performed by 54572 personnel - 150

ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS

The 3-, 5- and 7-skill level survey data were compared to the AFR 39-1 specialty descriptions for the Heating Systems Specialists (AFSC 54512/54532/54552) and the Heating Systems Technician (AFSC 54572), dated 1 January 1982. These descriptions are intended to give a broad overview of the duties and tasks performed by each skill level of the career ladder.

Based on the preceding DAFSC analysis, the 3- and 5-skill level descriptions appear complete and accurately reflect the broad range of duties and responsibilities of these personnel. Likewise, the 7-skill level description appears complete and accurate, reflecting not only the supervisory responsibilities, but the operation and maintenance duties as well.

ANALYSIS OF TAFMS

In this study, as in most others, an analysis of the total active federal military service (TAFMS) groups is undertaken to provide a description of how the jobs and the perception of those jobs within a career ladder change over time. As is typical in most career ladders, as time in service and experience increase, there is a corresponding increase in performance of duties involving supervisory, managerial, and training tasks (see Table 22). Conversely, as time spent in supervisory and administrative duties increases, performance time on tasks in the technical area generally declines. These shifts in primary areas of responsibility mirror the changes discussed earlier in the DAFSC analysis section.

Of the 1,080 545X2 members surveyed, 491 (46 percent) were identified as being in their first enlistment. Distribution of these members across specialty job groups is displayed in figure 2. The average paygrade for this group is E-3 and the average number of tasks performed is 131. These tasks are primarily concentrated in four major areas. They are: Installing Heating Systems and Equipment, Maintaining Heating System Components, Performing Contingency or Tactical Team Functions, and Maintaining Steam Heating Systems. For specific examples of tasks performed by this group, see Table 23.

The 49-96 months personnel average 149 tasks and an E-4 paygrade. Although they spend more time in supervisory and managerial duties than the 1-48 months group, they also spend the majority of their time in technical areas. The career group (97+ months) average 144 tasks and an E-5 paygrade. Their job involves mostly organizing and planning, directing and implementing, inspecting and evaluating, and training.

FIGURE 2

DISTRIBUTION OF FIRST-ENLISTMENT PERSONNEL
ACROSS JOB SPECIALTY GROUPS
(PERCENT MEMBERS RESPONDING)

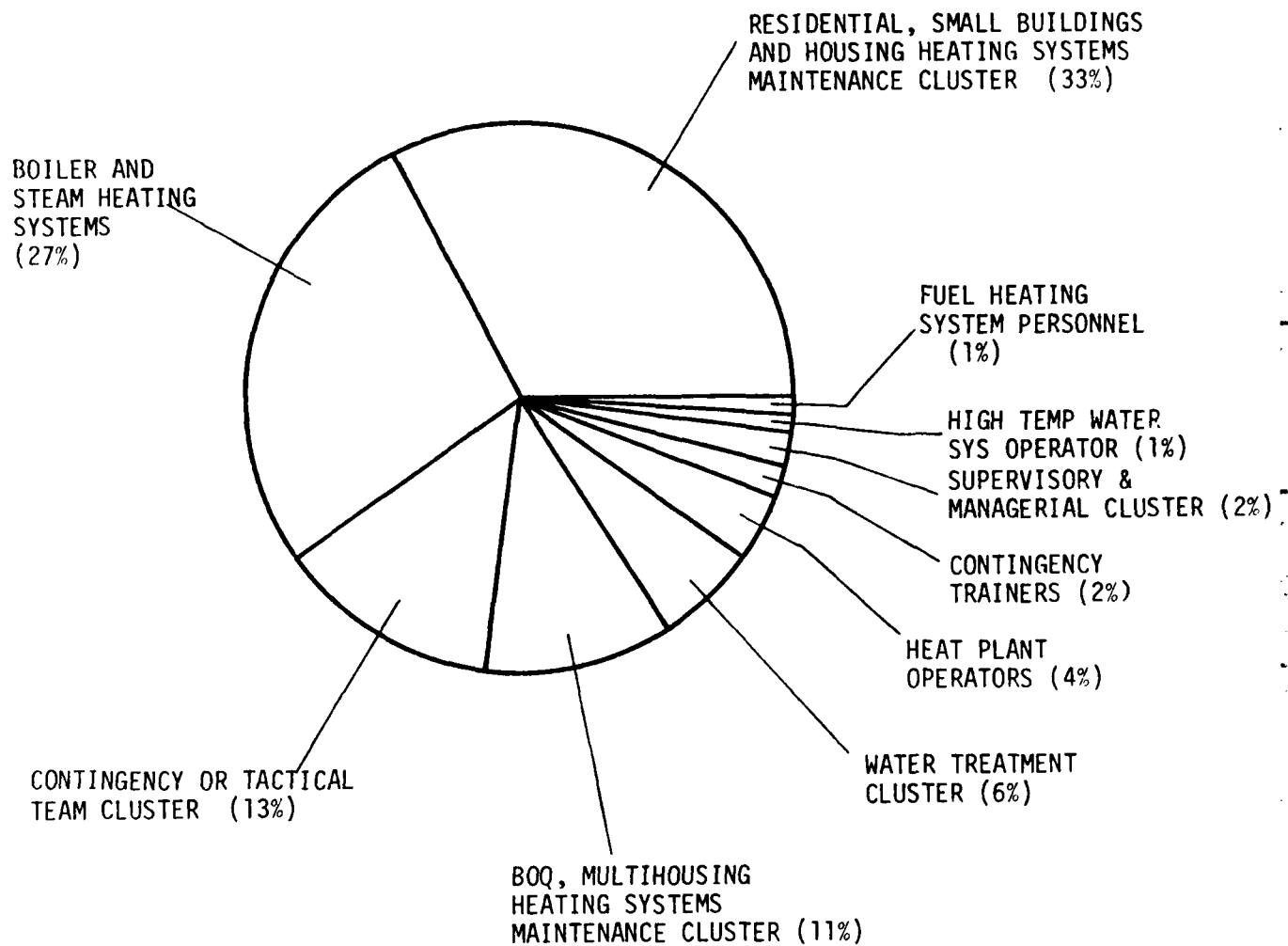


TABLE 22

RELATIVE PERCENT TIME SPENT ON DUTIES BY TAFMS GROUPS**

DUTIES	TAFMS (MONTHS)		
	1-48 (N=491)	49-96 (N=245)	97+ (N=324)
A ORGANIZING AND PLANNING	1	2	6
B DIRECTING AND IMPLEMENTING	2	3	7
C INSPECTING AND EVALUATING	1	2	5
D TRAINING	2	3	6
E PERFORMING ADMINISTRATIVE FUNCTIONS	2	2	2
F INSTALLING HEATING SYSTEMS AND EQUIPMENT	16	13	11
G MAINTAINING FORCED WARM AIR AND OTHER HEATING SYSTEMS	8	8	6
H MAINTAINING HEATING CONTROL SYSTEMS	4	4	3
I MAINTAINING HEATING ELECTRICAL SYSTEMS	6	6	5
J MAINTAINING PNEUMATIC SYSTEMS	2	1	1
K MAINTAINING HEATING SYSTEM COMPONENTS	12	11	8
L MAINTAINING AND OPERATING FUEL BURNING EQUIPMENT	5	6	4
M MAINTAINING STEAM HEATING SYSTEMS	11	11	9
N OPERATING STEAM HEATING SYSTEMS	2	3	2
O MAINTAINING HIGH TEMPERATURE WATER HEATING SYSTEMS	2	2	1
P OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	1	1	*
Q MAINTAINING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	2	3	2
R OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	2	3	2
S MAINTAINING CENTRAL STEAM PLANTS	3	3	2
T OPERATING CENTRAL STEAM PLANTS	2	2	1
U MAINTAINING FUEL AREAS	*	*	*
V PERFORMING WATER TREATMENT FUNCTIONS	5	4	3
W MAINTAINING AND SERVICING GAS DISTRIBUTION SYSTEM	1	1	1
X MAINTAINING SOLAR HEATING SYSTEMS	1	*	1
Y PERFORMING CONTINGENCY OR TACTICAL TEAM FUNCTIONS	11	10	11

* Denotes less than 1 percent

** Columns may not add to 100 percent due to rounding

TABLE 23

**REPRESENTATIVE TASKS PERFORMED BY FIRST-ENLISTMENT
PERSONNEL (1-48 MONTHS TAFMS)**

TASKS	PERCENT MEMBERS PERFORMING (N=491)
Y638 FIRE M-16 RIFLES	77
G207 THREAD PIPE BY MACHINE	76
G194 MEASURE AND CUT PIPE BY MACHINE	75
G193 MEASURE AND CUT PIPE BY HAND	71
G206 THREAD PIPE BY HAND	69
G192 MEASURE AND CUT COPPER TUBING	69
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	68
F126 INSTALL CHECK VALVES	68
I244 INSPECT MOTORS	63
K312 REMOVE OR REPLACE CHECK VALVES	63
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	62
F121 INSTALL BOILER GAUGE GLASSES	62
F145 INSTALL GAUGES	61
K317 REMOVE OR REPLACE GAUGES	61
F129 INSTALL CIRCULATING PUMPS	60
F136 INSTALL ELECTRIC MOTORS	60
F157 INSTALL PACKING	60
I252 REMOVE OR REPLACE FUSES	
K316 REMOVE OR REPLACE FILTERS	59
G195 MEASURE AND CUT PRE-FORMED INSULATION	58
L339 INSPECT FUEL LINES OR FITTINGS	58
M391 INSPECT STEAM TRAPS	57
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	57
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	57
F141 INSTALL FILTERS	57
F120 INSTALL BLACK IRON STEAM CONDENSATE LINES	57
I251 REMOVE OR REPLACE ELECTRIC MOTORS	57
F138 INSTALL FEED OR CONDENSATE PUMPS	57
F122 INSTALL BOILER SAFETY VALVES	56
I258 RESET CIRCUIT BREAKERS	55
M417 TRACE STEAM DISTRIBUTION SYSTEMS	55
K294 INSPECT AND CLEAN FILTERS	55
Y636 ERECT TENTS	55
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	54

Average number of tasks performed - 131

JOB SATISFACTION INDICATORS

By looking at group perceptions of jobs and similar data for comparative groups, managers may gain a better understanding of some of the factors affecting the job performance of airmen in the career field. This information was gathered through five inventory job attitude questions covering job interest, perceived utilization of talents and training, sense of accomplishment, and reenlistment intentions. Table 24 presents this information for TAFMS groups in the 545X2 career ladder and a comparative sample 2,539 respondents of direct support career ladders surveyed in 1983.

Comparisons of these groups show that job satisfaction indicators for all 545X2 TAFMS groups in expressed job interest, perceived utilization of talents, and sense of accomplishment are just slightly lower than the comparative sample, while indicators for perceived utilization of training and reenlistment intentions (with the exception of the 97+ months group) are slightly higher. Although the percentages are slightly lower, both the 545X2 and comparative samples have very high positive indicators and reflect good job satisfaction.

TABLE 24

**JOB SATISFACTION INDICATORS BY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)***

	1-48 MONTHS TAFMS		49-96 MONTHS TAFMS		97+ MONTHS TAFMS	
	545X2 (N=491)	COMPARATIVE SAMPLE** (N=1,076)	545X2 (N=245)	COMPARATIVE SAMPLE** (N=586)	545X2 (N=324)	COMPARATIVE SAMPLE** (N=877)
<u>EXPRESSED JOB INTEREST:</u>						
DULL	9	9	9	8	11	7
SO-SO	14	11	19	13	12	12
INTERESTING	76	79	70	76	76	78
<u>PERCEIVED USE OF TALENTS:</u>						
LITTLE OR NOT AT ALL	20	18	18	17	17	16
FAIRLY WELL TO PERFECTLY	79	82	80	83	82	83
<u>PERCEIVED USE OF TRAINING:</u>						
LITTLE OR NOT AT ALL	17	21	17	23	18	22
FAIRLY WELL TO PERFECTLY	83	79	82	77	81	77
<u>SENSE OF ACCOMPLISHMENT:</u>						
DISSATISFIED	15	16	13	16	18	17
NEUTRAL	12	8	16	8	9	9
SATISFIED	72	76	69	75	72	74
<u>REENLISTMENT INTENTIONS:</u>						
WILL RETIRE	2	1	4	1	12	15
WILL NOT/PROBABLY WILL NOT REENLIST	35	41	19	24	14	7
WILL/PROBABLY WILL REENLIST	61	57	77	74	74	77

* Columns may not equal 100 percent due to nonresponse and rounding

** Comparative sample of direct support career ladders surveyed in 1983, including AFSCs 121X0, 122X0, 222X0, 232X0, 472X4, 545X0, and 553X0

ANALYSIS OF 545X2 CONUS VERSUS OVERSEAS GROUPS

Comparisons were made of the tasks performed and background data for the 481 DAFSC 54552 personnel assigned to the continental United States (CONUS) versus the 123 5-level airmen in the military sample assigned to overseas locations. While overseas personnel performed an average of 110 tasks, CONUS members performed an average of 156 tasks, reflecting a much broader job than overseas airmen perform. Tasks which differentiate the two groups involve tasks related to gas-fired equipment, domestic gas stoves, interior gas distribution systems, steam systems, and water softeners (see Table 25).

Comparison of background data, such as job satisfaction indicators, grade, and service time, revealed little difference between the groups.

TABLE 25

EXAMPLES OF TASKS DIFFERENTIATING CONUS/OVERSEAS GROUPS

TASKS	PERCENT MEMBERS PERFORMING		
	CONUS (N=481)	OVERSEAS (N=123)	DIFFER- ENCES
L340 INSPECT GAS BURNERS	53	8	+45
Y636 ERECT TENTS	67	23	+44
L351 PERFORM GAS BURNER OPERATIONAL CHECKS	48	6	+42
L334 ADJUST GAS BURNER FUEL-AIR RATIOS	52	11	+41
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	68	28	+40
L356 REMOVE OR REPLACE GAS BURNERS	43	5	+38
K321 REMOVE OR REPLACE MECHANICAL WATER PUMP SEALS	45	14	+31
Y645 MAINTAIN CONTINGENCY HEATING SYSTEMS	54	24	+30
W559 INSPECT GAS DISTRIBUTION LINES FOR LEAKAGES	32	2	+30
F144 INSTALL GAS BURNERS	39	10	+29
K323 REMOVE OR REPLACE PACKING ON CENTRIFUGAL WATER PUMPS	42	14	+28
K328 REMOVE OR REPLACE STRAINERS	61	33	+28
Y655 OPERATE IMMERSION HEATERS	48	20	+28
V553 TEST pH OF CONDENSATE RETURN	36	8	+28
V539 DRAW BOILER WATER SAMPLES	43	16	+27
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	65	38	+27
W572 READ METERS	29	3	+26
.	.	.	.
.	.	.	.
.	.	.	.
L357 REMOVE OR REPLACE OIL BURNERS	45	67	-22
L353 PERFORM OIL BURNER OPERATIONAL CHECKS	46	66	-20
F153 INSTALL OIL BURNERS	41	59	-18
L344 INSPECT OIL STORAGE TANKS	32	50	-18
F123 INSTALL BOILERS	40	57	-17
L342 INSPECT OIL BURNERS	53	69	-16
L354 PERFORM OIL STORAGE TANK PREVENTIVE MAINTENANCE	16	29	-13

Average number of tasks performed by 12250 CONUS personnel - 156

Average number of tasks performed by 12250 overseas personnel - 110

MAJCOM ANALYSIS

Tasks and background data for personnel of the seven major commands (MAJCOM) with the largest 545X2 populations were compared to determine whether job content varied as a function of MAJCOM assignment. One of the major reasons for such a comparison is to detect differences in the jobs of first-enlistment personnel across MAJCOMs that might affect technical training. Table 26 compares duty differences across MAJCOMs for this group. The most noticeable difference here appears in PACAF where first-enlistment personnel spend more time maintaining and operating fuel burning equipment than the other MAJCOM 1-48 months respondents.

Analysis of duties and tasks performed and background data for the total military sample shows that all MAJCOMs were generally similar. The only differences of note are relatively low percent members performing and time spent on maintaining pneumatic systems, high temperature water heating systems, central steam plants, performing water treatment functions, and servicing gas distribution systems in USAFE and PACAF. Apart from these, no major differences appear between MAJCOMs in this comparison.

TABLE 26

RELATIVE PERCENT TIME SPENT BY FIRST-ENLISTMENT MAJCOM GROUPS

DUTIES	1-48 MONTHS TAFMS						
	SAC (N=127)	TAC (N=92)	AFLC (N=76)	MAC (N=70)	ATC (N=34)	USAF (N=30)	PACAF (N=20)
A ORGANIZING AND PLANNING	1	1	2	1	2	1	*
B DIRECTING AND IMPLEMENTING	2	2	2	1	2	1	1
C INSPECTING AND EVALUATING	1	1	1	2	2	*	*
D TRAINING	1	1	2	1	3	1	*
E PERFORMING ADMINISTRATIVE FUNCTIONS	1	2	2	2	2	1	1
F INSTALLING HEATING SYSTEMS AND EQUIPMENT	15	16	20	14	13	14	22
G MAINTAINING FORCED WARM AIR AND OTHER HEATING SYSTEMS							
H MAINTAINING HEATING CONTROL SYSTEMS	9	8	8	8	8	8	12
I MAINTAINING HEATING ELECTRICAL SYSTEMS	4	4	4	2	2	3	8
J MAINTAINING PNEUMATIC SYSTEMS	6	7	5	4	4	5	8
K MAINTAINING HEATING SYSTEM COMPONENTS	2	2	1	1	1	1	1
L MAINTAINING AND OPERATING FUEL BURNING EQUIPMENT	13	11	12	10	9	14	11
M MAINTAINING STEAM HEATING SYSTEMS	5	5	4	3	7	4	11
N OPERATING STEAM HEATING SYSTEMS	10	11	11	11	7	13	7
O MAINTAINING HIGH TEMPERATURE WATER HEATING SYSTEMS	2	2	2	3	1	3	2
P OPERATING HIGH TEMPERATURE WATER HEATING SYSTEMS	3	1	1	1	2	2	1
Q MAINTAINING LOW AND MEDIUM WATER HEATING SYSTEMS	1	1	1	*	1	*	*
R OPERATING LOW AND MEDIUM TEMPERATURE WATER HEATING SYSTEMS	2	2	2	1	2	2	4
S MAINTAINING CENTRAL STEAM PLANTS	3	2	2	1	5	2	3
T OPERATING CENTRAL STEAM PLANTS	2	3	3	4	2	3	2
U MAINTAINING FUEL AREAS	1	2	1	3	3	1	1
V PERFORMING WATER TREATMENT FUNCTIONS	*	*	*	1	*	1	*
W PERFORMING WATER TREATMENT FUNCTIONS	4	6	3	7	1	5	*
X MAINTAINING AND SERVICING DISTRIBUTION SYSTEMS	1	2	1	1	*	3	*
Y MAINTAINING SOLAR HEATING SYSTEMS	*	*	1	1	*	1	*
Z PERFORMING CONTINGENCY OR TACTICAL TEAM FUNCTIONS	10	9	10	16	19	10	6

TRAINING ANALYSIS

An especially important use of occupational survey data is in assisting the development of training programs that are relevant for military personnel working in their first assignments. Factors such as percent of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) personnel performing tasks and ratings of training emphasis or task difficulty may be used in evaluating training documents. Technical school personnel from the Sheppard Technical Training Center, Wichita Falls, Texas, matched inventory tasks to appropriate sections of the Specialty Training Standard (STS) and Plan of Instruction (POI) for the 542X2 career ladder. A computer listing displaying the percent members performing and training emphasis and task difficulty ratings for each task has been forwarded to the technical school for use in any further detailed review of training documents. A summary of that information is given below.

Training Emphasis

To provide a perspective on the types of tasks which are among the most important for training, Table 27 lists the 20 tasks rated by senior heating systems specialists as highest in importance for first-enlistment training as indicated by TE ratings (which are explained in the Task Factor Administration section in the INTRODUCTION of this report). These tasks dealt with installing, removing, and replacing and testing various heating equipment. Of these 20 tasks, 4 are not referenced in the J3ABR54532 POI. They were:

- install safety controls
- install black iron steam condensate lines
- install feed or condensate pumps
- install check valves

Three were not included in the STS:

- measure and cut pipe by machine
- install feed water controls
- install feed or condensate pumps

These tasks should be reviewed by training personnel to decide whether the tasks warrant inclusion in the STS and POI documents.

Task Difficulty

Task difficulty ratings were collected from 75 experienced career ladder NCOs. Those tasks which the raters indicate require the most time to learn include:

- evaluate budget or financial requirements
- install boilers, deaerators, demineralizers or water softeners, superheaters
- remove or replace boilers and coal burning equipment
- calibrate electronic controls
- isolate central heating plant control panel malfunctions

As expected, these types of tasks are performed primarily by the most experienced E-6 and E-7 paygrades and 7-skill level incumbents.

In contrast with the above tasks, the least difficult tasks involve:

- measure and cut preformed insulation
- reset circuit breakers and motor thermal overloads
- inspect compressor oil leaks, and
- remove or replace filters.

Specialty Training Standard (STS)

A comprehensive review of STS 545X2, dated December 1981, was made comparing STS items to task data and TE and TD ratings. Overall, the STS provides comprehensive coverage of the significant jobs performed and equipment maintained by military personnel in the field, with survey data supporting significant STS paragraphs or subparagraphs. Several areas of concern, however, need to be reviewed.

A number of paragraphs in the STS with task performance proficiency codes assigned did not have inventory tasks matched to them. This could mean that no applicable task has been matched, the element is inappropriately coded as a performance item rather than a knowledge item, or that there are no clearly defined inventory tasks appropriate to that element. Subject-matter specialists and training personnel should review these elements in detail to assure that inclusion is justified. If that is the case, the possible reason for the unmatched elements discussed above should be pursued and necessary adjustments made. (If it is determined there are no tasks in the inventory which can be matched to a valid performance element, it is requested that subject-matter specialists draft the appropriate task statements and forward them to the Occupational Measurement Center for review and use in the next inventory rewrite.) There were also several STS subparagraphs containing tasks matched with low or just slightly above average TE ratings and very low members performing. These are listed in Table 28 and should also be reviewed for possible elimination from the STS.

Tasks which were not matched to any element of the STS are listed at the end of the STS computer format. These 381 tasks were reviewed to determine whether they were concentrated around a common function. Several tasks appear to relate to a valid performance element. These unmatched tasks, especially those with high training emphasis and more than 20 percent members responding, should be reviewed to see if they should be matched, a new performance element added, or other adjustments made. Table 29 displays a listing of examples of the unmatched tasks.

Plan of Instruction

Based on the previously mentioned assistance from technical school subject-matter specialists in matching inventory tasks to the POI, a computer product was generated displaying the results of that matching process. Information furnished for consideration includes percent members performing, TE and TD ratings, as well as data for first-job (1-24 months TAFMS) and first-enlistment (1-48 months TAFMS) personnel.

In general, a review of the POI match indicates current training is fairly well justified, based on percent of first-job and first-enlistment personnel performing the matched tasks, their TE and TD ratings, and the nature of the tasks. Subject-matter specialists and training personnel might look again at six sections of the POI--IV.5B, IV.5E, VI.2B, VI.3B, VII.2D, and VIII.3A--as the inventory tasks matched to them have TEs below or only slightly above average, some TDs which are low, and very low percentages of people performing the tasks (see Table 30). These, it may be concluded, might be better handled through OJT.

The long list of tasks not matched to this POI should also be reviewed to ensure that matches are not justified; most of these will probably be left unmatched, as they pertain to supervisory jobs. Only 25 unmatched tasks (displayed in Table 31) were rated high in TE. Several of these tasks had high percentages of first-job and first-enlistment performers. These, in particular, should be reviewed.

The evaluation of subject matter, tasks, and issues discussed here is essential in an effort to determine the necessity for training and the most effective method to accomplish it.

TABLE 27

EXAMPLES OF TASKS IMPORTANT FOR TRAINING OF FIRST-ENLISTMENT 545X2 PERSONNEL
(30 PERCENT OR MORE MEMBERS PERFORMING)

TASKS	TRAINING EMPHASIS*	FIRST- ENLISTMENT (N=491)	TOTAL SAMPLE (N=1,080)	TASK DIFFICULTY**
G194 -MEASURE AND CUT PIPE BY MACHINE	6.33	75	70	3.41
F167 +INSTALL SAFETY CONTROLS	6.33	42	46	5.79
G207 THREAD PIPE BY MACHINE	6.24	76	70	3.75
G193 MEASURE AND CUT PIPE BY HAND	6.20	71	65	3.28
F136 INSTALL ELECTRIC MOTORS	6.09	60	52	5.19
V549 TEST BOILER WATER FOR CHLORIDES OR TOTAL DISSOLVED SOLIDS	6.06	33	27	5.00
F153 INSTALL OIL BURNERS	6.06	39	42	5.53
I251 REMOVE OR REPLACE ELECTRIC MOTORS	6.04	57	57	4.84
F122 INSTALL BOILER SAFETY VALVES	6.04	56	52	4.60
L353 PERFORM OIL BURNER OPERATIONAL CHECKS	6.00	43	49	4.50
G206 THREAD PIPE BY HAND	6.00	69	65	3.75
F120 +INSTALL BLACK IRON STEAM CONDENSATE LINES	6.00	57	51	4.36
V552 TEST BOILER WATER FOR TANNIN	5.96	26	21	4.78
V551 TEST BOILER WATER FOR SODIUM SULFATE	5.96	28	23	5.00
F139 -INSTALL FEED WATER CONTROLS	5.94	35	41	3.73
V553 TEST PH OF CONDENSATE RETURN	5.91	31	26	4.77
F138 --INSTALL FEED OR CONDENSATE PUMPS	5.91	57	49	5.52
H227 REMOVE OR REPLACE AUTOMATIC HEATING (CONTROL OF THERMOSTATS)	5.89	42	46	5.52
F142 INSTALL FURNACES	5.78	37	35	6.30
F126 +INSTALL CHECK VALVES	5.76	68	59	4.34

* Tasks rated above 5.23 are high in training emphasis

** Task difficulty of 5.00 is average

+ Not referenced in the J3ABR54532 P01

- Not referenced in the 545X2 STS

TABLE 28

**TASKS WITH LOW TRAINING EMPHASIS RATING AND MEMBERS PERFORMING
MATCHED TO STS SUBPARAGRAPHS**

STS REFERENCES	TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING		TASK DIFFICULTY**
			FIRST JOB (N=217)	FIRST ENLISTMENT (N=491)	
9A(4).	H217 CALIBRATE ELECTRONIC CONTROLS	3.20	7	8	7.60
	H220 CALIBRATE OIL SAFETY SWITCHES	2.94	5	5	6.16
9C(3).	J270 CALIBRATE PNEUMATIC CONTROLS	3.13	8	11	6.88
9C(b).	J264 ADJUST AIR COMPRESSOR BELTS	3.30	13	16	3.25
	J274 PERFORM PNEUMATIC SAFETY VALVE OPERATIONAL CHECKS	3.13	6	8	5.52
	J268 ALIGN AIR COMPRESSOR BELTS	3.02	13	14	3.72
	J265 ADJUST AIR COMPRESSOR PRESSURE CONTROLS	2.98	9	10	4.28
	J271 CLEAN AND LUBRICATE COMPRESSORS	2.54	11	14	4.10
9C(7).	J273 ISOLATE PNEUMATIC CONTROL MALFUNCTIONS	3.37	6	10	6.71
10D(6).	K292 FUSION WELD POLYETHYLENE PIPE OR FITTINGS	2.30	5	6	5.63
14B.	S487 CLEAN AND LUBRICATE STEAM PLANT STEAM INDICATING AND RECORDING EQUIPMENT	3.39	6	7	4.94
14I.	S519 SERVICE MECHANICAL POLLUTION COLLECTORS	3.00	3	3	6.25
15C.	U536 MAINTAIN COAL STORAGE AREAS	3.50	6	4	4.66
D.	U535 INSPECT COAL SHIPMENTS	3.24	4	4	4.76
E.	U534 INSPECT COAL HANDLING EQUIPMENT	3.09	6	6	5.05
F.	U533 COLLECT COAL SAMPLES FOR ANALYSIS	3.22	7	6	5.06
G.	U537 PREPARE COAL SAMPLES FOR ANALYSIS	3.54	4	4	5.17
16B.	G198 REMOVE OR REPLACE COAL BURNING EQUIPMENT	3.28	10	10	7.27
C.	F171 INSTALL SOLID FUEL BURNERS	2.96	3	6	6.56
E.	L349 LUBRICATE SOLID FUEL BURNERS	2.87	3	5	3.87
18G/M.	K303 MEASURE AIRFLOW OR PRESSURE WITH MANOMETERS	3.11	10	8	4.92

* Tasks rated 3.61 are average in training emphasis

** Task difficulty rating of 5.00 is average

TABLE 28 (Continued)

TASKS WITH LOW TRAINING EMPHASIS RATING AND MEMBERS PERFORMING
MATCHED TO STS SUBPARAGRAPHS

STS REFERENCES	TASKS	TRAINING EMPHASIS*	PERCENT MEMBERS PERFORMING		TASK DIFFICULTY**
			FIRST JOB (N=217)	FIRST ENLISTMENT (N=491)	
20D.	K304 MEASURE AIRFLOW WITH ANEMOMETERS	3.22	5	5	4.93
	K305 MEASURE AIRFLOW WITH VELOMETERS	3.22	5	5	5.05
	K303 MEASURE AIRFLOW OR PRESSURE WITH NONOMETERS	3.11	10	8	4.92
H. 22B.	H238 SERVICE HUMIDITY EQUIPMENT	2.59	7	8	5.20
	F169 INSTALL SOLAR HEATING SYSTEMS	3.09	4	5	8.38
F.	X600 INSTALL OR REPLACE SOLAR HEATING COLLECTOR RACKS	1.96	2	3	6.79
	X601 INSTALL OR REPLACE SOLAR HEATING COLLECTORS	1.78	2	3	7.10
	X602 INSTALL OR REPLACE SOLAR HEATING STORAGE TANKS	1.74	2	3	7.21
	X605 ISOLATE SOLAR HEATING PUMP MALFUNCTIONS	2.09	2	2	6.94
	X604 ISOLATE SOLAR HEATING HEAT EXCHANGER MALFUNCTIONS	2.04	2	2	7.11
	X606 ISOLATE SOLAR HEATING CONTROL MALFUNCTIONS	1.94	2	2	7.25
	X603 ISOLATE SOLAR HEATING COLLECTOR MALFUNCTIONS	1.89	2	3	7.56
	M393 INSTALL NEW TUBES BY HAND	3.35	7	10	7.04
	F134 INSTALL DEMINERALIZERS OR WATER SOFTENERS	3.35	7	10	7.36
	24D(12). 25P.	F133 INSTALL DEARATORS	2.67	5	8
S. 27B(2). D(1). G(2).	Y664 PERFORM DISEASE AND PESTILENCE COUNTERMEASURES	3.78	6	7	5.34
	Y660 PERFORM CAMP CANTONMENT CONSTRUCTION TECHNIQUES	3.02	9	11	4.93
	Y648 OPERATE CARGO TRUCKS FOR CONTINGENCY OR OPERATIONS	3.24	11	12	3.47
	Y650 OPERATE DUMP TRUCKS FOR CONTINGENCY EXERCISES OR OPERATIONS				
G(3).	Y648 OPERATE CARGO TRUCKS FOR CONTINGENCY EXERCISES OR OPERATIONS	2.76	5	9	4.08
G(7).	Y647 OPERATE BUSES FOR CONTINGENCY EXERCISES OR OPERATIONS	2.56	8	10	4.06
		1.78	4	6	3.57

* Tasks rated 3.61 are average in training emphasis

** Task difficulty rating of 5.00 is average

TABLE 29

EXAMPLES OF TASKS NOT MATCHED TO STS 545X2

TASKS	TRAINING EMPHASIS*	TASK DIFFICULTY**	PERCENT MEMBERS PERFORMING	
			FIRST-JOB (N=217)	FIRST-ENL (N=491)
G194 MEASURE AND CUT PIPE BY MACHINE	6.33	3.41	75	75
F139 INSTALL FEED WATER CONTROLS	5.94	6.11	30	35
F138 INSTALL FEED OR CONDENSATE PUMPS	5.91	5.52	54	57
M363 CLEAN FEED WATER CONTROLS (MCDONNELL-MILLER)	5.91	4.60	33	40
M385 INSPECT STEAM HEATING SYSTEM BOILER SAFETY VALVES	5.70	4.18	39	45
L340 INSPECT GAS BURNERS	5.67	3.92	37	42
M403 REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	5.59	4.82	47	50
F168 INSTALL SAFETY VALVES OTHER THAN BOILER SAFETY VALVES	5.52	5.14	27	32
S505 PERFORM AUTOMATIC BOILER CONTROL OPERATIONAL CHECKS	5.50	5.32	11	15
K321 REMOVE OR REPLACE MECHANICAL WATER PUMP SEALS	5.46	5.38	30	37
Q472 REMOVE OR REPLACE CIRCULATING PUMPS	5.44	4.59	47	47
I257 REMOVE OR REPLACE TRANSFORMERS	5.37	4.03	37	42
K325 REMOVE OR REPLACE SOLENOID VALVES	5.37	4.18	41	44
Y638 FIRE M-16 RIFLES	5.33	4.01	74	77
F135 INSTALL DISTRIBUTION LINES	5.28	5.55	43	45
K382 ADJUST VALVE AND DAMPER LINKAGES	5.26	3.18	58	60
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	5.24	3.72	43	49

* Tasks rated above 5.23 are high in training emphasis

** Task difficulty rating of 5.00 is average

TABLE 30

EXAMPLES OF TASKS WITH LOW TRAINING EMPHASIS AND PERCENT MEMBERS PERFORMING
MATCHED WITH POI OBJECTIVES

POI OBJECTIVES WITH REPRESENTATIVE TASKS	TNG EMPH*	TASK DIFF**	PERCENT MEMBERS PERFORMING	
			FIRST- JOB (N=217)	FIRST- ENLISTMENT (N=491)
IV.5B U537 PREPARE COAL SAMPLES FOR ANALYSIS	3.54	5.17	4	4
U536 MAINTAIN COAL STORAGE AREAS	3.50	4.66	6	4
U535 INSPECT COAL SHIPMENTS	3.24	4.76	4	4
U533 COLLECT COAL SAMPLES FOR ANALYSIS	3.22	5.06	7	6
U534 INSPECT COAL HANDLING EQUIPMENT	3.09	5.05	6	6
IV.5E L337 ADJUST SOLID FUEL BURNER FUEL-AIR RATIOS	4.28	5.86	8	10
L359 REMOVE OR REPLACE SOLID FUEL BURNERS	3.63	5.50	5	5
F130 INSTALL COAL-BURNING EQUIPMENT	3.59	7.28	7	7
L346 INSPECT SOLID FUEL BURNERS	3.37	4.96	6	6
G198 REMOVE OR REPLACE COAL BURNING EQUIPMENT	3.28	7.27	10	10
F171 INSTALL SOLID FUEL BURNERS	2.96	6.56	3	6
L349 LUBRICATE SOLID FUEL BURNERS	2.87	3.87	3	5
L343 INSPECT OIL PRE-HEATERS	3.54	3.98	8	10
VI.2B 0438 INSPECT PRESSURIZATION SYSTEMS	4.04	4.78	7	9
VI.3B 0437 INSPECT HIGH TEMPERATURE WATER HEATING SYSTEM CONDUITS	3.96	4.70	8	10
E104 MAKE ENTRIES ON AF FORMS 1163 (MONTHLY HIGH TEM- PERATURE WATER DISTRIBUTION SYSTEM OPERATING LOG)	3.85	4.15	7	8
0429 ALIGN HIGH TEMPERATURE WATER HEATING SYSTEM EXPANSION JOINTS	3.11	5.84	4	6
VII.2D M365 CLEAN NEW TUBE ENDS WITH EMERY CLOTH	3.87	3.87	12	16
VIII.3A F133 INSTALL DEAERATORS	2.67	7.33	5	8

* Average Training Emphasis is 3.61

** Task Difficulty rating of 5.00 is average

TABLE 31

TASKS HIGH IN TRAINING EMPHASIS NOT REFERENCED TO J3ABR54532 POI

TASKS	TRAINING EMPHASIS*	TASK DIFFICULTY**	PERCENT MEMBERS PERFORMING		
			FIRST-JOB (N=217)	FIRST-ENL (N=491)	
F167	INSTALL SAFETY CONTROLS	6.33	5.97	38	42
F120	INSTALL BLACK IRON STEAM CONDENSATE LINES	6.00	4.36	58	57
F138	+INSTALL FEED OR CONDENSATE PUMPS	5.91	5.52	54	57
F126	INSTALL CHECK VALVES	5.76	4.34	67	68
F175	INSTALL STEAM HEATING SYSTEM VALVES OR FITTINGS	5.76	4.77	49	51
N427	PERFORM STEAM HEATING SYSTEM COMBUSTION EFFICIENCY ANALYSES	5.76	5.69	20	22
F140	+INSTALL FEED WATER REGULATORS	5.72	5.73	35	40
F161	INSTALL PRESSURE CONTROLS	5.72	5.37	36	42
H239	+TEST SAFETY CONTROL OPERATIONS	5.65	5.99	25	30
M403	+REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	5.59	4.82	47	50
R484	PERFORM LOW OR MEDIUM TEMPERATURE WATER HEATING SYSTEM COMBUSTION EFFICIENCY ANALYSES	5.56	5.31	18	20
Y666	PERFORM FIRST AID LIFESAVING TECHNIQUES	5.56	5.43	25	32
F168	+INSTALL SAFETY VALVES OTHER THAN BOILER SAFETY VALVES	5.52	5.14	27	32
S505	+PERFORM AUTOMATIC BOILER CONTROL OPERATIONAL CHECKS	5.50	5.32	11	15
F180	+INSTALL TRANSFORMERS	5.48	4.70	28	35
K321	+REMOVE OR REPLACE MECHANICAL WATER PUMP SEALS	5.46	5.38	30	36
Y657	OPERATE TENT HEATERS	5.46	3.81	36	45
Q472	+REMOVE OR REPLACE CIRCULATING PUMPS	5.44	4.59	47	47
K312	REMOVE OR REPLACE CHECK VALVES	5.41	3.61	62	63
M400	REBUILD STEAM TRAPS	5.39	5.12	27	30
K325	+REMOVE OR REPLACE SOLENOID VALVES	5.37	4.18	41	44
Y638	+FIRE M-16 RIFLES	5.33	4.01	74	77
F135	+INSTALL DISTRIBUTION LINES	5.28	5.55	43	45
K315	+REMOVE OR REPLACE ELECTRICAL FANS	5.28	4.17	36	38
K282	+ADJUST VALVE AND DAMPER LINKAGES	5.26	4.68	20	26

+ Not referenced in the 545X2 STS

* Tasks rated above 5.23 are high in training emphasis

** Task difficulty rating of 5.00 is average

STRENGTH AND STAMINA

In addition to ratings for the difficulty of tasks, experienced NCOs in the 545X2 career ladder also indicated which tasks any of the 545X2 personnel they supervised had experienced difficulty performing because of excessive physical strength of stamina requirements inherent in the task. The tasks identified by several raters that require excessive strength and stamina are presented in Table 32.

Although no major problems in physical requirements seem to exist and are not a factor in course elimination rate, some raters commented that there were some problems for tall people inside small steam drums, and for some personnel unable to lift chemicals in 80-100 pound bags, remove and replace large and heavy heating coils, and lift or carry average heating tool boxes weighing approximately 100 pounds. The X-factor for this career field is Stage 1 (max lift of 100 pounds to height of 6 feet), which should cover the majority of these comments.

TABLE 32
TASKS INDICATED BY EXPERIENCED 545X2 NCOs TO REQUIRE
EXCESSIVE PHYSICAL STRENGTH

TASKS		PERCENT MEMBERS PERFORMING
		1-48 MONTHS (N=491)
Y631	ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	57
A25	INSTALL CENTRIFUGAL WATER PUMPS	53
G205	REMOVE OR REPLACE UNIT HEATERS	48
F182	INSTALL UNIT HEATERS	44
K318	REMOVE OR REPLACE HEATING SYSTEM	43
G197	REMOVE OR REPLACE BOILERS	42
F123	INSTALL BOILERS	39
G199	REMOVE OR REPLACE FURNACES	38
F142	INSTALL FURNACES	37
F147	INSTALL HEAT EXCHANGERS	33
G203	REMOVE OR REPLACE SECTIONAL BOILER SECTIONS	26
F134	INSTALL DEMINERALIZERS OR WATER SOFTENERS	10

COMPARISON TO PREVIOUS SURVEYS

Results of this survey were compared to the results of OSR AFPT 90-545-274 (Refrigeration and Air Conditioning and Heating Systems Career Ladders), dated 30 September 1977. Comparisons were made to career ladder structure (Table 33) and job satisfaction indicators by TAFMS groups (Table 34). Although the 1977 survey included the Refrigeration and Air Conditioning career ladder (AFSC 545X0) and Mechanical Superintendents (AFSC 54790), only Heating Systems career ladder personnel (AFSC 547X0-1977) appear in comparison data, unless otherwise indicated.

Other than changing the AFSC designation from 547X0 to 545X2, the Heating Systems career ladder seems to have undergone little change. Heating personnel appear with supervisors forming separate clusters in both the 1984 and 1977 surveys. Technical training instructors surfaced in both surveys, as well as a group specializing in work pertaining to fuels. In the 1977 survey, this fuel Area NCO group spent 61 percent of their time maintaining fuel areas, and most were assigned to overseas bases. They were described as primarily inspecting oil tanks for water or other impurities, verifying quantity of fuel oil in tanks, and inspecting gas or oil fuel line fittings. Sixty-one percent of the independent job type identified in this survey are assigned to bases outside the continental United States. Personnel in this fuel heating systems job group spend most of their time maintaining and operating fuel-burning equipment. Different from the fuel area group previously mentioned, their tasks include inspecting oil burners, adjusting oil burner fuel-air ratios, inspecting fuel lines or fittings, and many other similar tasks involving fuel systems. The differences between the two surveys seem few. There seems to be more specialization in the present survey, perhaps due to the inclusion of series-related civilian personnel. In the 1977 study, the heating systems personnel were identified in one large cluster. Conversely, in this survey, several groups were identified according to the type of heating system maintained. In addition, tactical team and contingency duties were added to the 1984 inventory, allowing this special group to be identified in this survey. Other than these small differences, the career ladder structure remains stable.

Job satisfaction indicators for job interest, utilization of talents and training, and reenlistment intentions across the two surveys were reviewed and showed few meaningful changes. The increases that exist in the reenlistment indicator are consistent with an overall Air Force trend of increasing reenlistment intentions.

TABLE 33
JOB SPECIALTY COMPARISONS ACROSS CURRENT AND PREVIOUS SURVEY

1984 OSR (545X2)	1977 OSR (545X0/547X0/54790)
RESIDENTIAL, SMALL BLDGS AND HOUSING (N=267)	
BOILER AND STEAM HEATING SYSTEMS (N=1,017)	
CONTINGENCY TRAINERS (N=18)	
HIGH TEMP WATER SYSTEM (N=50)	
HEAT PLANT OPERATORS (N=105)	
WATER TREATMENT (N=49)	
BOQ, MULTIHousing (N=55)	
FUEL HEATING SYSTEMS (N=13)	
SUPERVISORS AND MANAGERS (N=132)	
TECHNICAL TRAINING INSTRUCTORS (N=5)	
CONTINGENCY OR TACTICAL TEAM (N=83)	
	HEATING SYSTEMS SPECIALISTS/TECHNICIANS (N=924)
	FUEL AREA NCOs (N=5)
	SUPERVISORY PERSONNEL (545X0/547X0/54790) (N=216)
	TRAINING INSTRUCTORS (545X0/547X0) (N=24)

TABLE 34

JOB SATISFACTION INDICATORS BY TAFMS GROUPS AND PREVIOUS SURVEY*

	1-48 MONTHS TAFMS		49+ MONTHS TAFMS	
	545X2 (1984)	547X0 (1977)	545X2 (1984)	547X0 (1977)
<u>EXPRESSED JOB INTEREST:</u>				
DULL	9	9	10	8
SO-SO	14	12	15	11
INTERESTING	76	72	73	74
<u>PERCEIVED USE OF TALENTS:</u>				
LITTLE OR NOT AT ALL	20	24	17	15
FAIRLY WELL TO PERFECTLY	79	75	81	84
<u>PERCEIVED USE OF TRAINING:</u>				
LITTLE OR NOT AT ALL	17	19	18	15
FAIRLY WELL TO PERFECTLY	83	78	81	84
<u>REENLISTMENT INTENTIONS:</u>				
WILL NOT/PROBABLY WILL NOT REENLIST	35	61	16	22
WILL/PROBABLY WILL REENLIST	50	38	75	64

* Columns may not equal 100 percent due to nonresponse or rounding

COMPARISON OF HEATING SYSTEMS AND REFRIGERATION AND AIR CONDITIONING PERSONNEL

One special concern of this study was to examine jobs within the Heating Systems specialty and compare them to jobs found in the Refrigeration and Air Conditioning specialty to discuss the similarities and the possible merging of the two career fields. While not every issue involved in this possible merger lends itself to empirical study, USAFOMC can provide certain useful data to aid in that decisionmaking process. This section is devoted to discussing some of those concerns which may be addressed through the analysis of data collected with the current survey and that obtained in the Refrigeration and Air Conditioning career ladder study in July 1983. In addition, a working group of subject-matter specialists from both career fields reviewed tasks contained in both inventories and discussed task commonality between the two AFSCs.

With Refrigeration and Air Conditioning tasks not included in the inventory for this study, a working group was determined to be the most effective, efficient method to obtain an idea as to what tasks in the 545X2 inventory are also performed by 545X0 personnel. The first technical area discussed, which was clearly common to both fields, was Installing Heating Systems and Equipment. Of the 66 tasks listed in this duty (F), subject-matter specialists agreed that only 27 of these tasks (41 percent) were determined to be unique to Heating Systems personnel. Examples of these tasks are:

- install boilers
- install central heating plant control panels
- install coal-burning equipment
- install deaerators
- install oil burners

These tasks clearly refer to heating units and, as expected, showed no commonality. Of the 66 tasks in this functional area, 39 (59 percent) were determined to be common to both AFSCs and are listed in Table 35:

The next functional area reviewed was Maintaining Forced Warm Air and Other Heating Systems (Duty G). This area contained 23 tasks, of which only 5 were considered to relate only to the 545X2 specialty. These were:

- remove or replace boilers
- remove or replace coal burning equipment
- remove or replace primary systems for domestic hot water
- remove or replace sectional boiler sections
- mix and apply powered insulation

TABLE 35

FUNCTIONAL AREA (F): INSTALLING HEATING SYSTEMS AND EQUIPMENT
TASKS COMMON TO 545X2 AND 545X0 PERSONNEL

INSTALL AIR BLEED VALVES
INSTALL CENTRIFUGAL WATER PUMPS
INSTALL GAUGES
INSTALL ELECTRIC MOTORS
INSTALL PRESSURE CONTROL
INSTALL AQUASTATS
INSTALL CHECK VALVES
INSTALL CHEMICAL FEEDING EQUIPMENT
INSTALL CIRCUIT BREAKERS
INSTALL CIRCULATING PUMPS
INSTALL CORROSION TESTERS
INSTALL DISTRIBUTION LINES
INSTALL ELECTRICAL CONTROLS
INSTALL FEED OR CONDENSATE PUMPS
INSTALL FEED WATER CONTROLS
INSTALL FEED WATER REGULATORS
INSTALL FILTERS
INSTALL GAS BURNERS
INSTALL GENERATOR OR SYSTEM PUMPS
INSTALL BLOWERS
INSTALL HUMIDISTATS
INSTALL INSULATING MATERIALS ON DUCTS OTHER THAN
PRE-FORMED INSULATION
INSTALL INSULATING MATERIALS ON PIPES OTHER THAN
PRE-FORMED INSULATION
INSTALL MOTOR STARTERS
INSTALL PNEUMATIC CONTROLS
INSTALL PRE-FORMED INSULATION
INSTALL PRESSURE CONTROLS
INSTALL PRESSURE POTENTIOMETERS
INSTALL PRESSURE REGULATING VALVES (PRV)
INSTALL RELAYS
INSTALL SAFETY CONTROLS
INSTALL SAFETY VALVES OTHER THAN BOILER SAFETY VALVES
INSTALL STARTING OR RUNNING CAPACITORS
INSTALL SYSTEM VALVES OR FITTINGS
INSTALL TEMPERATURE RECORDING EQUIPMENT
INSTALL TIMERS
INSTALL TRANSFORMERS
INSTALL VALVE OR DAMPER LINKAGES
INSTALL WATER REGULATING VALVES

The remaining 18 tasks (75 percent) represent the commonality in this area and are listed in Table 36.

Maintaining Heating Control Systems (Duty H) was another area with several common tasks. There were 32 tasks relevant to this area, and only 5 were unique to Heating Systems. These were:

- adjust pressure potentiometers
- adjust safety controls
- inspect humidity equipment
- inspect reheating systems
- remove or replace central heating plant control panel components

The 27 tasks (84 percent) considered common to both specialties are listed in Table 37.

TABLE 36

**FUNCTIONAL AREA (G): MAINTAINING FORCED WARM AIR AND OTHER
HEATING SYSTEMS
TASKS COMMON TO 545X2 AND 545X0 PERSONNEL**

- BALANCE SYSTEMS
- CLEAN EXCHANGERS
- CONNECT EXHAUST OUTLETS TO FLUES OR STACKS
- CONNECT OUTLETS TO DUCTS
- FABRICATE COPPER TUBING SYSTEMS
- INSPECT EXCHANGERS
- LUBRICATE BLOWERS
- MEASURE AND CUT COPPER TUBING
- MEASURE AND CUT PIPE BY HAND
- MEASURE AND CUT PIPE BY MACHINE
- MEASURE AND CUT PRE-FORMED INSULATION
- REMOVE OR REPLACE FURNACES
- REMOVE OR REPLACE EXCHANGERS
- REMOVE OR REPLACE BLOWERS
- REMOVE OR REPLACE SPACE HEATERS
- REMOVE OR REPLACE UNIT HEATERS OR CHILLED WATER SYSTEMS
- THREAD PIPE BY HAND
- THREAD PIPE BY MACHINE

TABLE 37

FUNCTIONAL AREA (H): MAINTAINING HEATING CONTROL SYSTEMS,
TASKS COMMON TO 545X2 AND 545X0 PERSONNEL

ADJUST ELECTRICAL THERMOSTATS OR PRESSURE SWITCHES
ADJUST ELECTRONIC CONTROLS
ADJUST HUMIDISTATS
ADJUST HUMIDITY EQUIPMENT OTHER THAN HUMIDISTATS
ADJUST OIL SAFETY SWITCHES
ANALYZE PRESSURE OR TEMPERATURE READINGS
CALIBRATE ELECTRICAL THERMOSTATS OR PRESSURE SWITCHES
CALIBRATE ELECTRONIC CONTROLS
CALIBRATE HUMIDISTATS
CALIBRATE MOTORIZED VALVES
CALIBRATE OIL SAFETY SWITCHES
CALIBRATE PRESSURE POTENTIOMETERS
CLEAN AND SERVICE CENTRAL CONTROL PANELS
ISOLATE CENTRAL PLANT CONTROL PANEL MALFUNCTIONS
ISOLATE ELECTRICAL CONTROL MALFUNCTIONS
REMOVE OR REPLACE AUTOMATIC CONTROLS OR THERMOSTATS
REMOVE OR REPLACE ELECTRICAL CONTROLS
REMOVE OR REPLACE ELECTRICAL WIRING ON CONTROLS
REMOVE OR REPLACE ELECTRONIC CONTROL COMPONENTS
REMOVE OR REPLACE ELECTRONIC CONTROLS
REMOVE OR REPLACE MANUAL CONTROLS
REMOVE OR REPLACE HUMIDISTATS
REMOVE OR REPLACE OIL SAFETY SWITCHES
REMOVE OR REPLACE PRESSURE POTENTIOMETERS
REMOVE OR REPLACE SAFETY CONTROL COMPONENTS
SERVICE HUMIDITY EQUIPMENT
TEST SAFETY CONTROL OPERATIONS

Unlike the functional areas just discussed, the duty of Maintaining Heating Electrical Systems was determined to depend on the base. Some bases evidently designate trouble-shooters or consider these responsibilities to belong to the Controls personnel (545X3). The same appears to be true for Maintaining Pneumatic Systems functional area (Duty J).

The tasks involved in Maintaining Heating Systems Components seemed to have little commonality. The only tasks, of the 56 in this area, that specialists designated as common were the following:

- adjust centrifugal water pump
- adjust computer sensing devices for heating systems
- adjust couplings or pulleys
- adjust dampers
- adjust drive belts
- adjust valve and damper linkages
- adjust water regulating valves
- align couplings or pulleys
- align drive belts

The remaining duty areas were considered to pertain only to various heating systems (i.e., central steam plants and solar heating systems). The tasks involved in performing water treatment functions were considered common to both; however, the chemicals involved are different.

As shown by the large number of tasks in the Heating Systems career ladder inventory considered by specialists in both fields to be commonly performed, there seems to be a great deal of similarity in the jobs performed. Note that this comparison was done using the Heating Systems career ladder inventory and thus would not identify tasks that are unique to the Refrigeration and Air Conditioning career ladder personnel. If the issue of merging becomes more prominent, this same comparison should be done by a working group using the Refrigeration and Air Conditioning inventory.

In addition to this small working group, a comparison of tasks performed by 54550 and 54552 personnel was made, using 1983 and 1984 OSR data, respectively. Table 38 lists those tasks with a large percentage of members performing in both groups. Each of these tasks was also identified previously by the subject-matter specialists as being very common to both AFSCs.

In summary, the special consideration of this study, discussed above, tends to suggest two conclusions. First, according to specialists in both fields and OSR data for both AFSCs, there exists a great deal of commonality in routine tasks performed by Heating Systems personnel and Refrigeration and Air Conditioning personnel. Second, the differences that do exist appear to be in tasks involving large plants (i.e., Central Steam Plants, Operating Fuel Burning Equipment, and Steam Heating Systems).

TABLE 38

EXAMPLES OF TASKS SIMILAR TO AFS 545X2 AND 545X0

TASKS	PERCENT MEMBERS PERFORMING	
	54552 (N=606)	54550 (N=679)
MEASURE AND CUT COPPER TUBING	71	86
REMOVE OR REPLACE BLOWERS	45	72
ISOLATE ELECTRICAL CONTROL MALFUNCTIONS	23	57
REMOVE OR REPLACE ELECTRIC MOTORS	63	74
INSTALL ELECTRIC MOTORS	62	74
INSPECT AND CLEAN FILTERS	56	82
REMOVE OR REPLACE ELECTRICAL WIRING	45	68
ADJUST VALVES	41	66
INSTALL VALVES	52	65
LUBRICATE BEARINGS	48	78
CLEAN STRAINERS	53	59
ALIGN PULLEYS	48	72
LUBRICATE BEARINGS	48	78
ADJUST DAMPERS	44	62
ADJUST DRIVE BELTS	45	84
INSTALL GAUGES	62	75

IMPLICATIONS

Occupational survey results indicate that jobs within this career ladder vary as a function of what type of heating system the incumbents install or maintain and the amount of time they spend on the tasks related to the various systems.

Few differences were found between the job performed by military and civilian personnel. All groups contained a mix of civilian and military personnel, with the exception of Contingency groups and the Technical Training group. Of the remaining groups, only three job groups showed a difference in terms of tasks performed by the military and civilian members: Residential, Small Buildings, and Housing Heating Systems Maintenance cluster, Boiler Water Treatment job type, and the OJT Training Personnel job type.

There were variations in the percent of military and civilian personnel within each job group. Constant findings were that civilian members tend to have been in Government service much longer than military counterparts, and military members average slightly more tasks, reflecting a broader job.

The indicators of job satisfaction for specialty job groups revealed that civilian members in all groups found their jobs interesting and felt their talents and training well utilized, where there were indicators in a few job groups with less than 60 percent military members responding favorably.

Training in the 545X2 career ladder, as evaluated through the STS and POI, appears to be thorough. Only 14 tasks with high percent members performing and high training emphasis were unmatched to POI and STS references. There were 29 areas in the STS and 6 objectives in the POI which contain tasks with low percent members performing and training emphasis. These should be reviewed by technical school personnel.

Based on analysis of the tasks performed by both Heating Personnel (AFSC 545X2) and Refrigeration and Air Conditioning Personnel (AFSC 545X0), there is a large number of tasks common to both specialties. The differences that are apparent are related to the central plants.

APPENDIX A
SELECTED REPRESENTATIVE TASKS
FOR
CAREER LADDER STRUCTURE GROUPS

TABLE I
RESIDENTIAL, SMALL BUILDINGS, AND HOUSING HEATING SYSTEMS
MAINTENANCE CLUSTER (GRP255)

TASKS	PERCENT MEMBERS PERFORMING (N=267)
G207	96
G194	94
G192	91
G206	91
G193	89
F126	86
F129	84
K312	81
F136	79
I251	79
G205	76
G195	76
F118	75
F145	74
K316	73
F120	73
F132	72
F138	72
I244	72
K317	71
M391	70
F141	69
Q472	69
F157	69
I252	69
K314	69
F182	69
F163	69
F122	68
G191	67

TABLE 1A
ELECTRICAL MAINTENANCE PERSONNEL
(GRP396)

TASKS	PERCENT MEMBERS PERFORMING (N=11)
K289 CLEAN AND LUBRICATE MOTOR OR FAN BEARINGS	100
G207 THREAD PIPE BY MACHINE	100
G206 THREAD PIPE BY HAND	100
K279 ADJUST COUPLINGS OR PULLEYS	100
H227 REMOVE OR REPLACE AUTOMATIC HEATING CONTROLS OR THERMOSTATS	100
K280 ADJUST DAMPERS	100
K284 ALIGN COUPLINGS OR PULLEYS	100
K282 ADJUST VALVE AND DAMPER LINKAGES	100
I252 REMOVE OR REPLACE FUSES	91
I258 RESET CIRCUIT BREAKERS	91
I251 REMOVE OR REPLACE ELECTRIC MOTORS	91
K296 INSPECT BLOWER BEARINGS	91
K288 CLEAN AND LUBRICATE BLOWER BEARINGS	91
G192 MEASURE AND CUT COPPER TUBING	91
H208 ADJUST ELECTRICAL THERMOSTATS OR PRESSURE SWITCHES	91
K314 REMOVE OR REPLACE COUPLINGS OR PULLEYS	91
K329 REMOVE OR REPLACE VALVE AND DAMPER LINKAGES	91
F125 INSTALL CENTRIFUGAL WATER PUMPS	91
K323 REMOVE OR REPLACE PACKING ON CENTRIFUGAL WATER PUMPS	91
F138 INSTALL FEED OR CONDENSATE PUMPS	91
F167 INSTALL SAFETY CONTROLS	91
F163 INSTALL PRESSURE REGULATING VALVES (PRV)	91
F152 INSTALL MOTOR STARTERS	91
K294 INSPECT AND CLEAN FILTERS	82
K299 INSPECT DRIVE BELTS	82
F136 INSTALL ELECTRIC MOTORS	82
K300 INSPECT MOTOR OR FAN BEARINGS	82
G194 MEASURE AND CUT PIPE BY MACHINE	82
G193 MEASURE AND CUT PIPE BY HAND	82
I243 INSPECT FUSES OR CIRCUIT BREAKERS	82

TABLE II
BOILER AND STEAM HEATING SYSTEM CLUSTER
(GRP376)

TASKS	PERCENT MEMBERS PERFORMING (N=1,017)
G207 THREAD PIPE BY MACHINE	94
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	93
M373 DRAIN STEAM HEATING SYSTEM BOILERS	93
M384 INSPECT STEAM HEATING SYSTEM BOILER MANHOLE AND HANDHOLE COVERS	93
M382 INSPECT STEAM HEATING SYSTEM BOILER FEED AND CONDENSATE PUMPS	93
G194 MEASURE AND CUT PIPE BY MACHINE	93
M375 FILL STEAM HEATING SYSTEM BOILERS	93
G193 MEASURE AND CUT PIPE BY HAND	93
M409 REMOVE OR REPLACE STEAM HEATING BOILER GAUGE GLASSES	92
M391 INSPECT STEAM TRAPS	92
G206 THREAD PIPE BY HAND	92
M385 INSPECT STEAM HEATING SYSTEM BOILER SAFETY VALVES	92
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	92
K312 REMOVE OR REPLACE CHECK VALVES	91
G192 MEASURE AND CUT COPPER TUBING	91
M410 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER MANHOLE OR HANDHOLE COVER GASKETS	90
M368 CLEAN STEAM HEATING SYSTEM BOILER GAUGE GLASSES	90
K317 REMOVE OR REPLACE GAUGES	90
M380 INSPECT FEED WATER CONTROLS (MCDONNELL-MILLER)	88
M369 CLEAN STEAM HEATING SYSTEM BOILER TUBES	88
L339 INSPECT FUEL LINES OR FITTINGS	88
M405 REMOVE OR REPLACE BOILER SAFETY VALVES	88
M417 TRACE STEAM DISTRIBUTION SYSTEMS	88
F126 INSTALL CHECK VALVES	88
M390 INSPECT STEAM LINES OR CONDUITS	87
M386 INSPECT STEAM HEATING SYSTEM COMBUSTION CHAMBERS	87
I252 REMOVE OR REPLACE FUSES	86
M403 REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	86
N426 PERFORM STEAM HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	86
K300 INSPECT MOTOR OR FAN BEARINGS	86

TABLE IIA
BOILER PLANT OPERATORS
(GRP394)

TASKS	PERCENT MEMBERS PERFORMING (N=311)
N425 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	97
M375 FILL STEAM HEATING SYSTEM BOILERS	97
M384 INSPECT STEAM HEATING SYSTEM BOILER MANHOLE AND HANDHOLE COVERS	96
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	96
M373 DRAIN STEAM HEATING SYSTEM BOILERS	95
T521 BLOWDOWN CENTRAL STEAM PLANT BOILER OR WATER COLUMNS	95
T522 CHECK CENTRAL STEAM PLANT BOILER WATER LEVEL	94
M385 INSPECT STEAM SYSTEM BOILER SAFETY VALVES	94
T526 LIGHT-OFF CENTRAL STEAM PLANT BOILERS	93
M382 INSPECT STEAM HEATING SYSTEM BOILER FEED AND CONDENSATE PUMPS	93
S499 INSPECT CENTRAL STEAM PLANT BOILER MANHOLE AND HANDHOLE COVERS	93
T523 DRAIN CENTRAL STEAM PLANT BOILERS	93
N426 PERFORM STEAM HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	92
M410 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER MANHOLE OR HANDHOLE COVER GASKETS	92
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	92
S493 FILL CENTRAL STEAM PLANT BOILERS AND CHECK FOR LEAKS	91
M368 CLEAN STEAM HEATING SYSTEM BOILER GAUGE GLASSES	91
S509 PREPARE BOILERS FOR INSPECTIONS	90
T530 PERFORM CENTRAL STEAM PLANT BOILER PRE-OPERATIONAL CHECKS	90
S513 REMOVE OR REPLACE CENTRAL STEAM PLANT BOILER MANHOLE AND HANDHOLE COVER GASKETS	90
S497 INSPECT CENTRAL PLANT BOILER FEED AND CONDENSATE PUMPS	90
M386 INSPECT STEAM HEATING SYSTEM COMBUSTION CHAMBERS	90
M369 CLEAN STEAM HEATING SYSTEM BOILER TUBES	90
V539 DRAW BOILER WATER SAMPLES	89
S514 REMOVE OR REPLACE CENTRAL STEAM PLANT BOILER GAUGE GLASSES	88
V545 PERFORM CHEMICAL FEEDING	88
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	88
M391 INSPECT STEAM TRAPS	87
M377 INSPECT AND WASH DOWN STEAM HEATING SYSTEM BOILER WATER SIDES	87
S489 CLEAN CENTRAL STEAM PLANT BOILER GAUGE GLASSES	86

TABLE IIB
BOILER WATER TREATMENT PERSONNEL
(GRP418)

TASKS	PERCENT MEMBERS PERFORMING (N=15)
V539 DRAW BOILER WATER SAMPLES	100
V549 TEST BOILER WATER FOR CHLORIDES OR TOTAL DISSOLVED SOLIDS	100
V550 TEST BOILER WATER FOR PHOSPHATES	100
V553 TEST PH OF CONDENSATE RETURN	100
V548 TEST BOILER WATER FOR CAUSTICITY	100
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	100
V545 PERFORM CHEMICAL FEEDING	100
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	100
M43 REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	100
G206 THREAD PIPE BY HAND	100
M380 INSPECT FEED WATER CONTROLS (MCDONNELL-MILLER)	100
F121 INSTALL BOILER GAUGE GLASSES	100
F126 INSTALL CHECK VALVES	100
G207 THREAD PIPE BY MACHINE	93
N426 PERFORM STEAM HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	93
M410 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER MANHOLE OR HANDHOLE COVER GASKETS	93
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	93
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	93
M385 INSPECT STEAM HEATING SYSTEM BOILER SAFETY VALVES	93
M391 INSPECT STEAM TRAPS	93
M382 INSPECT STEAM HEATING SYSTEM BOILER FEED AND CONDENSATE PUMPS	93
V540 DRAW CONDENSATE RETURN WATER SAMPLES	87
G193 MEASURE AND CUT PIPE BY HAND	87
M417 TRACE STEAM DISTRIBUTION SYSTEMS	87
M363 CLEAN FEED WATER CONTROLS (MCDONNELL-MILLER)	87
M384 INSPECT STEAM HEATING SYSTEM BOILER MANHOLE AND HANDHOLE COVERS	87
M368 CLEAN STEAM HEATING SYSTEM BOILER GAUGE GLASSES	87
F145 INSTALL GAUGES	87
G195 MEASURE AND CUT PRE-FORMED INSULATION	87
F122 INSTALL BOILER SAFETY VALVES	87

TABLE IIC
GENERAL HEATING SYSTEMS MAINTENANCE PERSONNEL
(GRP438)

TASKS	PERCENT MEMBERS PERFORMING (N=691)
G192 MEASURE AND CUT COPPER TUBING	99
G207 THREAD PIPE BY MACHINE	98
G194 MEASURE AND CUT PIPE BY MACHINE	98
G193 MEASURE AND CUT PIPE BY HAND	98
G206 THREAD PIPE BY HAND	97
K312 REMOVE OR REPLACE CHECK VALVES	96
M31 INSPECT STEAM TRAPS	95
K317 REMOVE OR REPLACE GAUGES	95
K314 REMOVE OR REPLACE COUPLINGS OR PULLEYS	94
F126 INSTALL CHECK VALVES	94
I252 REMOVE OR REPLACE FUSES	94
M405 REMOVE OR REPLACE BOILER SAFETY VALVES	94
K300 INSPECT MOTOR OR FAN BEARINGS	93
M403 REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	93
M373 DRAIN STEAM HEATING SYSTEM BOILERS	93
K316 REMOVE OR REPLACE FILTERS	93
I251 REMOVE OR REPLACE ELECTRIC MOTORS	93
M382 INSPECT STEAM HEATING SYSTEM BOILER FEED AND CONDENSATE PUMPS	93
M413 REMOVE OR REPLACE STEAM HEATING SYSTEM PRESSURE RELIEF VALVES	93
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	92
M417 TRACE STEAM DISTRIBUTION SYSTEMS	92
K325 REMOVE OR REPLACE SOLENOID VALVES	92
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	92
I244 INSPECT MOTORS	92
F129 INSTALL CIRCULATING PUMPS	92
G191 LUBRICATE HEATING BLOWERS	92
M380 INSPECT FEED WATER CONTROLS (MCDONNELL-MILLER)	92
K279 ADJUST COUPLINGS OR PULLEYS	92
G195 MEASURE AND CUT PRE-FORMED INSULATION	92
F138 INSTALL FEED OR CONDENSATE PUMPS	92

TABLE III
CONTINGENCY TRAINERS
(GRP268)

TASKS	PERCENT MEMBERS PERFORMING (N=18)
L342 INSPECT OIL BURNERS	100
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	94
D74 CONDUCT OJT	94
L335 ADJUST OIL BURNER FUEL-AIR RATIOS	94
D79 DETERMINE OJT TRAINING REQUIREMENTS	94
I252 REMOVE OR REPLACE FUSES	94
Y638 FIRE M-16 RIFLES	94
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	89
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	89
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	89
G194 MEASURE AND CUT PIPE BY MACHINE	89
G207 THREAD PIPE BY MACHINE	89
G192 MEASURE AND CUT COPPER TUBING	89
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	89
A4 DETERMINE WORK PRIORITIES	83
L339 INSPECT FUEL LINES OR FITTINGS	83
Y636 ERECT TENTS	83
G206 THREAD PIPE BY HAND	83
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	83
F145 INSTALL GAUGES	83
F126 INSTALL CHECK VALVES	83
D86 EVALUATE OJT TRAINEES	78
A20 PLAN WORK ASSIGNMENTS	78
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	78
B37 INTERPRET BLUEPRINTS, DRAWINGS, OR SPECIFICATIONS	78
D98 VERIFY CDC COURSE COMPLETIONS	78
M417 TRACE STEAM DISTRIBUTION SYSTEMS	78
G193 MEASURE AND CUT PIPE BY HAND	78
B39 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	78
I263 WIRE-IN MOTORS TO POWER SOURCES	78

TABLE IV
HIGH TEMPERATURE WATER SYSTEM OPERATORS
(GRP209)

TASKS	PERCENT MEMBERS PERFORMING (N=50)
P462 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM OPERATIONAL CHECKS	98
P459 LIGHT-OFF HIGH TEMPERATURE WATER HEATING SYSTEMS	98
0435 INSPECT HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS FOR LEAKS	96
P460 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	94
J272 INSPECT COMPRESSOR OIL LEVELS	94
J269 BLOWDOWN CONDENSATE FROM AIR TANKS	92
0433 FILL HIGH TEMPERATURE WATER HEATING SYSTEMS WITH WATER AND BLEED AIR FROM SYSTEMS	92
0432 DRAIN OR FLUSH HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS	92
V539 DRAW BOILER WATER SAMPLES	90
0436 INSPECT HIGH TEMPERATURE WATER HEATING SYSTEM PRESSURE RELIEF VALVES	88
0430 CLEAN HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS	86
0439 INSPECT SAFETY VALVES	86
K289 CLEAN AND LUBRICATE MOTOR OR FAN BEARINGS	86
G192 MEASURE AND CUT COPPER TUBING	86
P463 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM CONTROL VALVE OPERATIONAL CHECKS	84
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	84
V545 PERFORM CHEMICAL FEEDING	84
G193 MEASURE AND CUT PIPE BY HAND	84
G206 THREAD PIPE BY HAND	82
J264 ADJUST AIR COMPRESSOR BELTS	82
0440 INSPECT TEMPERATURE RECORDING EQUIPMENT	80
K291 CLEAN STRAINERS	80
0447 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM REFRACTORY REPAIRS	80
K302 LUBRICATE FANS	80
G207 THREAD PIPE BY MACHINE	80
G194 MEASURE AND CUT PIPE BY MACHINE	80
V551 TEST BOILER WATER FOR SODIUM SULFATES	78
K299 INSPECT DRIVE BELTS	78
K314 REMOVE OR REPLACE COUPLINGS OR PULLEYS	78
K312 REMOVE OR REPLACE CHECK VALVES	78

TABLE IVA
FUEL BURNING EQUIPMENT OPERATORS
(GRP656)

<u>TASKS</u>	<u>PERCENT MEMBERS PERFORMING (N=16)</u>
P462 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM OPERATIONAL CHECKS	100
P460 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	100
0435 INSPECT HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS FOR LEAKS	100
0433 FILL HIGH TEMPERATURE WATER HEATING SYSTEMS WITH WATER AND BLEED AIR FROM SYSTEMS	100
0436 INSPECT HIGH TEMPERATURE WATER HEATING SYSTEM PRESSURE RELIEF VALVES	100
0439 INSPECT SAFETY VALVES	100
0430 CLEAN HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS	100
0432 DRAIN OR FLUSH HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS	100
0446 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM BOILER OR EXPANSION TANK HYDROSTATIC TESTS	100
P459 LIGHT-OFF HIGH TEMPERATURE WATER HEATING SYSTEMS	94
J272 INSPECT COMPRESSOR OIL LEVELS	94
J269 BLOWDOWN CONDENSATE FROM AIR TANKS	94
0438 INSPECT PRESSURIZATION SYSTEMS	94
P463 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM CONTROL VALVE OPERATIONAL CHECKS	94
K280 ADJUST DAMPERS	94
0447 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM REFRACTORY REPAIRS	94
0451 REMOVE OR REPLACE HIGH TEMPERATURE WATER HEATING SYSTEM SAFETY VALVES	94
0452 REMOVE OR REPLACE HIGH TEMPERATURE WATER PRESSURE RELIEF VALVES	94
K279 ADJUST COUPLINGS OR PULLEYS	94
J264 ADJUST AIR COMPRESOR BELTS	94
K317 REMOVE OR REPLACE GAUGES	94
K312 REMOVE OR REPLACE CHECK VALVES	94
P461 PERFORM HIGH TEMPERATURE WATER HEATING SYSTEM COMBUSTION EFFICIENCY ANALYSES	88
K300 INSPECT MOTOR OR FAN BEARINGS	88
K298 INSPECT DAMPERS	88
K299 INSPECT DRIVE BELTS	88
0442 LAY UP HIGH TEMPERATURE WATER HEATING SYSTEM BOILERS	88

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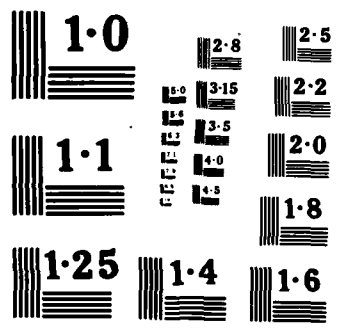


TABLE V
HEAT PLANT OPERATORS
(GRP184)

TASKS	PERCENT MEMBERS PERFORMING (N=105)
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	94
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	89
T521 BLOWDOWN CENTRAL STEAM PLANT BOILER OR WATER COLUMNS	88
M384 INSPECT STEAM HEATING SYSTEM BOILER MANHOLE AND HANDHOLE COVERS	88
M373 DRAIN STEAM HEATING SYSTEM BOILERS	85
T522 CHECK CENTRAL STEAM PLANT BOILER WATER LEVEL	83
M375 FILL STEAM HEATING SYSTEM BOILERS	81
V545 PERFORM CHEMICAL FEEDING	80
T526 LIGHT-OFF CENTRAL STEAM PLANT BOILERS	77
E106 MAKE ENTRIES ON AF FORMS 1458 (DAILY STEAM BOILER PLANT OPERATION LOG)	75
V550 TEST BOILER WATER FOR PHOSPHATES	75
V548 TEST BOILER WATER FOR CAUSTICITY	74
S499 INSPECT CENTRAL STEAM PLANT BOILER MANHOLE AND HANDHOLE COVERS	74
V539 DRAW BOILER WATER SAMPLES	73
V553 TEST PH OF CONDENSATE RETURN	73
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	73
T523 DRAIN CENTRAL STEAM PLANT BOILERS	73
V549 TEST BOILER WATER FOR CHLORIDES OR TOTAL DISSOLVED SOLIDS	72
M382 INSPECT STEAM HEATING SYSTEM BOILER FEED AND CONDENSATE PUMPS	72
N426 PERFORM STEAM HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	70
M410 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER MANHOLE OR HANDHOLE COVER GASKETS	70
M368 CLEAN STEAM HEATING SYSTEM BOILER GAUGE GLASSES	70
S493 FILL CENTRAL STEAM PLANT BOILERS AND CHECK FOR LEAKS	70
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	70
T30 PERFORM CENTRAL STEAM PLANT BOILER PRE-OPERATIONAL CHECKS	69
N423 CHECK STEAM HEATING SYSTEM BOILER TRICOCKS	69
V540 DRAW CONDENSATE RETURN WATER SAMPLES	68
F121 INSTALL BOILER GAUGE GLASSES	68
S513 REMOVE OR REPLACE CENTRAL STEAM PLANT BOILER MANHOLE AND HANDHOLE COVER GASKETS	67
M385 INSPECT STEAM HEATING SYSTEM BOILER SAFETY VALVES	66

TABLE VI
BOILER FUEL HEATING SYSTEMS PERSONNEL
(GRP272)

TASKS	PERCENT MEMBERS PERFORMING (N=13)
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	92
L357 REMOVE OR REPLACE OIL BURNERS	92
M409 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER GAUGE GLASSES	92
L342 INSPECT OIL BURNERS	85
L353 PERFORM OIL BURNER OPERATIONAL CHECKS	85
L339 INSPECT FUEL LINES OR FITTINGS	85
M377 INSPECT AND WASH DOWN STEAM HEATING SYSTEM BOILER WATER SIDES	85
G207 THREAD PIPE BY MACHINE	85
M368 CLEAN STEAM HEATING SYSTEM BOILER GAUGE GLASSES	85
391 INSPECT STEAM TRAPS	77
M361 CLEAN AND INSPECT STEAM HEATING SYSTEM COMBUSTION CHAMBERS	77
L335 ADJUST OIL BURNER FUEL-AIR RATIOS	77
M384 INSPECT STEAM HEATING SYSTEM BOILER MANHOLE AND HANDHOLE COVERS	77
M375 FILL STEAM HEATING SYSTEM BOILERS	77
M373 DRAIN STEAM HEATING SYSTEM BOILERS	77
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	77
K316 REMOVE OR REPLACE FILTERS	77
R481 LIGHT-OFF LOW OR MEDIUM TEMPERATURE WATER HEATING SYSTEM BOILERS	77
I251 REMOVE OR REPLACE ELECTRIC MOTORS	77
M380 INSPECT FEED WATER CONTROLS (MCDONNELL-MILLER)	69
M369 CLEAN STEAM HEATING SYSTEM BOILER TUBES	69
K294 INSPECT AND CLEAN FILTERS	69
G194 MEASURE AND CUT PIPE BY MACHINE	69
I252 REMOVE OR REPLACE FUSES	69
R477 DRAIN OR FLUSH LOW OR MEDIUM TEMPERATURE WATER HEATING SYSTEM BOILERS	69
M410 REMOVE OR REPLACE STEAM HEATING SYSTEM BOILER MANHOLE OR HANDHOLE COVER GASKETS	69
Y638 FIRE M-16 RIFLES	69
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	62
M385 INSPECT STEAM HEATING SYSTEM BOILER SAFETY VALVES	62
M363 CLEAN FEED WATER CONTROLS (MCDONNELL-MILLER)	62

TABLE VII
BOQ, MULTIHousing HEATING SYSTEMS
MAINTENANCE CLUSTER
(GRP073)

TASKS	PERCENT MEMBERS PERFORMING (N=55)
G207 THREAD PIPE BY MACHINE	84
G194 MEASURE AND CUT PIPE BY MACHINE	82
G206 THREAD PIPE BY HAND	79
G193 MEASURE AND CUT PIPE BY HAND	78
F126 INSTALL CHECK VALVES	78
F120 INSTALL BLACK IRON STEAM CONDENSATE LINES	71
F129 INSTALL CIRCULATING PUMPS	67
G192 MEASURE AND CUT COPPER TUBING	64
F138 INSTALL FEED OR CONDENSATE PUMPS	64
F136 INSTALL ELECTRIC MOTORS	60
F157 INSTALL PACKING	58
F141 INSTALL FILTERS	58
F175 INSTALL STEAM HEATING SYSTEM VALVES OR FITTINGS	53
F145 INSTALL GAUGES	53
G195 MEASURE AND CUT PRE-FORMED INSULATION	52
F163 INSTALL PRESSURE REGULATING VALVES (PRV)	51
F125 INSTALL CENTRIFUGAL WATER PUMPS	51
F121 INSTALL BOILER GAUGE GLASSES	51
F118 INSTALL AIR BLEED VALVES	49
M391 INSPECT STEAM TRAPS	45
F182 INSTALL UNIT HEATERS	45
F122 INSTALL BOILER SAFETY VALVES	45
Y638 FIRE M-16 RIFLES	45
F135 INSTALL DISTRIBUTION LINES	44
G205 REMOVE OR REPLACE UNIT HEATERS	44
I252 REMOVE OR REPLACE FUSES	44
F132 INSTALL COUPLINGS OR PULLEYS	42
F159 INSTALL PRE-FORMED INSULATION	41
K312 REMOVE OR REPLACE CHECK VALVES	41
M403 REMOVE OR REPLACE BLACK IRON STEAM CONDENSATE LINES	40

TABLE VIII
WATER TREATMENT CLUSTER
(GRP203)

TASKS	PERCENT MEMBERS PERFORMING (N=49)
V550 TEST BOILER WATER FOR PHOSPHATES	96
V539 DRAW BOILER WATER SAMPLES	96
V549 TEST BOILER WATER FOR CHLORIDES OR TOTAL DISSOLVED SOLIDS	94
V545 PERFORM CHEMICAL FEEDING	94
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	94
V548 TEST BOILER WATER FOR CAUSTICITY	92
V553 TEST PH OF CONDENSATE RETURN	88
V540 DRAW CONDENSATE RETURN WATER SAMPLES	80
V551 TEST BOILER WATER FOR SODIUM SULFATES	76
Y638 FIRE M-16 RIFLES	65
V555 TEST RAW WATER FOR HARDNESS	63
N422 BLOWDOWN STEAM HEATING SYSTEM BOILERS OR WATER COLUMNS	63
V541 INSPECT CHEMICAL REAGENTS AND TEST EQUIPMENT	63
V542 MAINTAIN BOILER CHEMICAL STORAGE AREAS	63
E106 MAKE ENTRIES ON AF FORMS 1458 (DAILY STEAM BOILER PLANT OPERATION LOG)	61
T521 BLOWDOWN CENTRAL STEAM PLANT BOILER OR WATER COLUMNS	61
E107 MAKE ENTRIES ON AF FORMS 1459 (WATER TREATMENT OPERATING LOG FOR STEAM AND HOT WATER BOILERS)	61
T522 CHECK CENTRAL STEAM PLANT BOILER WATER LEVEL	59
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	59
V552 TEST BOILER WATER FOR TANNIN	53
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	53
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	53
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	49
N424 LIGHT-OFF STEAM HEATING SYSTEM BOILERS	47
V544 MONITOR DEMINERALIZERS OR WATER SOFTENERS	45
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	45
V554 TEST PH OF SOLUTIONS OTHER THAN CONDENSATE RETURN	43
E108 MAKE ENTRIES ON AF FORMS 1464 (MONTHLY STEAM BOILER PLANT OPERATING LOG)	43
Y636 ERECTS TENTS	43
N426 PERFORM STEAM HEATING SYSTEM BOILER PRE-OPERATIONAL CHECKS	35

TABLE VIIIA
WATER SAMPLING AND TESTING PERSONNEL
(GRP243)

TASKS	PERCENT MEMBERS PERFORMING (N=11)
V548 TEST BOILER WATER FOR CAUSTICITY	100
V549 TEST BOILER WATER FOR CHLORIDES OR TOTAL DISSOLVED SOLIDS	100
V550 TEST BOILER WATER FOR PHOSPHATES	100
V553 TEST PH OR CONDENSATE RETURN	91
V545 PERFORM CHEMICAL FEEDING	91
V551 TEST BOILER WATER FOR SODIUM SULFATES	82
V543 MIX CHEMICALS REQUIRED TO TREAT WATER	82
V539 DRAW BOILER WATER SAMPLES	82
V552 TEST BOILER WATER FOR TANNIN	64
V555 TEST RAW WATER FOR HARDNESS	64
V554 TEST PH OF SOLUTIONS OTHER THAN CONDENSATE RETURN	64
V541 DRAW CONDENSATE RETURN WATER SAMPLES	64
E107 MAKE ENTRIES ON AF FORMS 1459 (WATER TREATMENT OPERATING LOG FOR STEAM AND HOT WATER BOILERS)	64
Y636 ERECT TENTS	55
Y638 FIRE M-16 RIFLES	55
V542 MAINTAIN BOILER CHEMICAL STORAGE AREAS	45
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PRTECTIVE CLOTHING	45
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	45
W572 READ METERS	36
V541 INSPECT CHEMICAL REAGENTS AND TEST EQUIPMENT	36
V544 MONITOR DEMINERALIZERS OR WATER SOFTENERS	36
T521 BLOWDOWN CENTRAL STEAM PLANT BOILER OR WATER COLUMNS	36
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	36
Y675 PRACTICE CONVOY TECHNIQ LS	36
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	27
E106 MAKE ENTRIES ON AF FORMS 1458 (DAILY STEAM BOILER PLANT OPERATION LOG)	27
V546 PREPARE WATER SAMPLES FOR SHIPMENT	27
T522 CHECK CENTRAL STEAM PLANT BOILER WATER LEVEL	27
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	27
H215 ANALYZE PRESSURE OR TEMPERATURE READINGS	27

TABLE IX
SUPERVISORY AND MANAGERIAL CLUSTER
(GRP153)

TASKS	PERCENT MEMBERS PERFORMING (N=132)
A4 DETERMINE WORK PRIORITIES	97
B42 SUPERVISE CIVILIANS	94
A20 PLAN WORK ASSIGNMENTS	94
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	94
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	93
A22 SCHEDULE LEAVES OR PASSES	93
A11 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	89
B38 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	89
A3 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT, OR SUPPLIES	89
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	88
C51 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSI- FICATION, OR SPECIAL AWARDS	88
B39 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	88
A8 ESTABLISH HAND OR SPECIAL TOOL REQUIREMENTS	85
B37 INTERPRET BLUEPRINTS, DRAWINGS, OR SPECIFICATIONS	84
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	83
A10 ESTABLISH ORGANIZATIONAL POLICIES, OFFICE INSTRUCTIONS (OI) OR STANDING OPERATING PROCEDURES (SOP)	83
A13 ESTABLISH SHOP EQUIPMENT REQUIREMENTS	83
D72 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	83
B47 WRITE CORRESPONDENCE	81
C50 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	81
B32 IMPLEMENT SAFETY PROGRAMS	80
A23 SCHEDULE PERSONNEL FOR SCHOOLS, TEMPORARY DUTY (TDY) ASSIGNMENTS, OR NON-TECHNICAL TRAINING	80
C48 ANALYZE WORKLOAD REQUIREMENTS	79
C63 EVALUATE WORK SCHEDULES	79
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	78
A17 PLAN SAFETY PROGRAMS	78
A14 ESTABLISH SUPPLY BENCH STOCK LEVELS	78
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	77
C54 EVALUATE JOB DESCRIPTIONS	74
C64 INDORSE AIRMAN PERFORMANCE REPORTS (APR)	73

TABLE IXA
BOILER PLANT FOREMAN
(GRP539)

TASKS	PERCENT MEMBERS PERFORMING (N=69)
A22 SCHEDULE LEAVES OR PASSES	100
B42 SUPERVISE CIVILANS	99
A4 DETERMINE WORK PRIORITIES	99
A20 PLAN WORK ASSIGNMENTS	99
B38 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	97
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	96
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	96
B39 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	94
D72 ASSIGN ON-THE-JOB TRAINING (OJT) TRAINERS	94
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	93
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	93
A11 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	93
C51 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSI- FICATION, OR SPECIAL AWARDS	93
A13 ESTABLISH SHOP EQUIPMENT REQUIREMENTS	93
B37 INTERPRET BLUEPRINTS, DRAWINGS, OR SPECIFICATIONS	93
A23 SCHEDULE PERSONNEL FOR SCHOOLS, TEMPORARY DUTY (TDY) ASSIGNMENTS, OR NON-TECHNICAL TRAINING	93
C48 ANALYZE WORKLOAD REQUIREMENTS	90
A3 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT, OR SUPPLIES	90
A8 ESTABLISH HAND OR SPECIAL TOOL REQUIREMENTS	90
C50 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	88
C63 EVALUATE WORK SCHEDULES	87
A10 ESTABLISH ORGANIZATIONAL POLICIES, OFFICE INSTRUCTIONS (OI), OR STANDING OPERATING PROCEDURES (SOP)	87
B46 UPDATE SEASONAL OR RECURRING MAINTENANCE FORMS	86
A14 ESTABLISH SUPPLY BENCH STOCK LEVELS	84
B32 IMPLEMENT SAFETY PROGRAMS	84
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	84
C54 EVALUATE JOB DESCRIPTIONS	84
B47 WRITE CORRESPONDENCE	83
C64 INDORSE AIRMAN PERFORMANCE REPORTS (APR)	81
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	80

TABLE IXB
OJT TRAINING PERSONNEL
(GRP420)

TASKS	PERCENT MEMBERS PERFORMING (N=36)
A4 DETERMINE WORK PRIORITIES	100
A20 PLAN WORK ASSIGNMENTS	100
B38 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	100
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	100
A1 ASSIGN PERSONNEL TO DUTY POSITIONS	97
B39 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	97
A8 ESTABLISH HAND OR SPECIAL TOOL REQUIREMENTS	97
B42 SUPERVISE CIVILIANS	94
B43 SUPERVISE HEATING SYSTEMS SPECIALISTS (AFSC 54552)	94
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	94
A22 SCHEDULE LEAVES OR PASSES	94
A11 ESTABLISH PERFORMANCE STANDARDS FOR SUBORDINATES	94
B29 DIRECT MAINTENANCE OR UTILIZATION OF EQUIPMENT, SUPPLIES, OR WORKSPACE	94
A17 PLAN SAFETY PROGRAMS	94
A13 ESTABLISH SHOP EQUIPMENT REQUIREMENTS	94
D79 DETERMINE OJT TRAINING REQUIREMENTS	94
A3 DETERMINE REQUIREMENTS FOR SPACE, PERSONNEL, EQUIPMENT, OR SUPPLIES	92
D86 EVALUATE OJT TRAINEES	92
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	92
B37 INTERPRET BLUEPRINTS, DRAWINGS, OR SPECIFICATIONS	92
G207 THREAD PIPE BY MACHINE	92
A14 ESTABLISH SUPPLY BENCH STOCK LEVELS	89
E102 MAINTAIN MAINTENANCE RECORD FILES	89
C51 EVALUATE INDIVIDUALS FOR PROMOTION, DEMOTION, RECLASSI- FICATION, OR SPECIAL AWARDS	89
A10 ESTABLISH ORGANIZATION POLICIES, OFFICE INSTRUCTIONS (OI), OR STANDING OPERATIONAL PROCEDURES (SOP)	89
L339 INSPECT FUEL LINES OR FITTINGS	89
G206 THREAD PIPE BY HAND	89
C48 ANALYZE WORKLOAD REQUIREMENTS	86
C63 EVALUATE WORK SCHEDULES	86
C50 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	86

TABLE X
TECHNICAL TRAINING INSTRUCTORS
(SPC900)

TASKS	PERCENT MEMBERS PERFORMING (N=5)
D70 ADMINISTER TESTS	100
D75 CONDUCT RESIDENT COURSE CLASSROOM TRAINING	100
D97 SCORE TESTS	100
D87 EVALUATE PROGRESS OF RESIDENT COURSE STUDENTS	100
D81 DEVELOP LESSON PLANS	100
C50 EVALUATE COMPLIANCE WITH PERFORMANCE STANDARDS	100
D88 EVALUATE TRAINING METHODS, TECHNIQUES, OR PROGRAMS	100
D94 PREPARE LESSON PLANS	100
D95 PREPARE TRAINING AIDS, SPACE, OR EQUIPMENT	100
338 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	100
D100 WRITE TEST QUESTIONS	80
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	80
D91 MAINTAIN TRAINING RECORDS, CHARTS, OR GRAPHS	80
I241 INSPECT ELECTRICAL CIRCUITS	80
D84 DIRECT OR IMPLEMENT TRAINING PROGRAMS OTHER THAN OJT	80
D90 MAINTAIN TRAINING EQUIPMENT	80
I242 INSPECT ELECTRICAL POWER SUPPLIES	80
I244 INSPECT MOTORS	80
I243 INSPECT FUSES OR CIRCUIT BREAKERS	80
339 INVENTORY EQUIPMENT, TOOLS, OR SUPPLIES	80
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	60
D78 DEMONSTRATE HOW TO LOCATE TECHNICAL INFORMATION	60
D89 MAINTAIN STUDY REFERENCE FILES	60
D71 ADVISE STAFF OR UNIT PERSONNEL ON TRAINING MATTERS	60
D82 DEVELOP RESIDENT COURSE OR CAREER DEVELOPMENT COURSE (CDC) CURRICULUM MATERIALS	60
L339 INSPECT FUEL LINES OR FITTINGS	60
T247 INSPECT TRANSFORMERS	60
L351 PERFORM GAS BURNER OPERATIONAL CHECKS	60
B32 IMPLEMENT SAFETY PROGRAMS	60
B34 IMPLEMENT STANDARDIZATION PROGRAMS	60
H208 ADJUST ELECTRICAL THERMOSTATS OR PRESSURE SWITCHES	60
I258 RESET CIRCUIT BREAKERS	60
W559 INSPECT GAS DISTRIBUTION LINES FOR LEAKAGES	60
W570 PERFORM GAS PRESSURE REGULATOR OPERATIONAL CHECKS	60
K298 INSPECT DAMPERS	60
K299 INSPECT DRIVE BELTS	60

TABLE XI
CONTINGENCY OR TACTICAL TEAM CLUSTER
(GRP030)

TASKS	PERCENT MEMBERS PERFORMING (N=83)
Y638 FIRE M-16 RIFLES	90
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	83
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	81
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	75
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	67
Y636 ERECT TENTS	63
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	61
Y678 PRACTICE SELF-PROTECTION FROM EXTREME WEATHER	49
Y639 IDENTIFY CHEMICAL WARFARE AGENTS	46
Y675 PRACTICE CONVOY TECHNIQUES	45
Y657 OPERATE TENT HEATERS	43
G207 THREAD PIPE BY MACHINE	41
Y676 PRACTICE EXPEDIENT METHODS	41
Y666 PERFORM FIRST AID LIFESAVING TECHNIQUES	41
Y661 PERFORM COVER AND CONCEALMENT TECHNIQUES	41
Y674 PRACTICE COMSEC OR OPSEC DURING CONTINGENCY EXERCISES OR OPERATIONS	40
Y655 OPERATE IMMERSION HEATERS	40
G194 MEASURE AND CUT PIPE BY MACHINE	37
Y645 MAINTAIN CONTINGENCY HEATING SYSTEMS	37
Y649 OPERATE CHEMICAL WARFARE PERSONNEL PROTECTIVE EQUIPMENT	34
Y662 PERFORM CRATER DAMAGE REPAIR	34
Y671 PERFORM WEAPONS FIRE CONTROL	34
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	34
Y670 PERFORM MILITARY FIELD SANITATION TECHNIQUES	33
Y637 FIRE .38 CALIBER PISTOLS	31
Y665 PERFORM EXPLOSIVE ORDNANCE RECONNAISSANCE	31
G193 MEASURE AND CUT PIPE BY HAND	30
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	30
L339 INSPECT FUEL LINES OR FITTINGS	30

TABLE XIA
CONTINGENCY TECHNICIANS
(GRP206)

TASKS	PERCENT MEMBERS PERFORMING (N=11)
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	100
G194 MEASURE AND CUT PIPE BY MACHINE	100
G207 THREAD PIPE BY MACHINE	100
Y638 FIRE M-16 RIFLES	91
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	82
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	82
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	82
Y636 ERECT TENTS	73
G193 MEASURE AND CUT PIPE BY HAND	73
G206 THREAD PIPE BY HAND	73
Y678 PRACTICE SELF-PROTECTION FROM EXTREME WEATHER	64
Y674 PRACTICE COMSEC OR OPSEC DURING CONTINGENCY EXERCISES OR OPERATIONS	64
Y639 IDENTIFY CHEMICAL WARFARE AGENTS	64
M390 INSTALL BLACK IRON STEAM CONDENSATE LINES	64
M391 INSPECT STEAM TRAPS	64
F157 INSTALL PACKING	64
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	64
Y676 INSTALL CHECK VALVES	64
Y675 PRACTICE CONVOY TECHNIQUES	55
Y671 PERFORM WEAPONS FIRE CONTROL	55
F147 INSTALL FILTERS	55
Y417 TRACE STEAM DISTRIBUTION SYSTEMS	55
F125 INSTALL CENTRIFUGAL WATER PUMPS	55
F138 INSTALL FEED OR CONDENSATE PUMPS	55
K328 REMOVE OR REPLACE STRAINERS	55
F309 REMOVE ASBESTOS INSULATION ON DUCTS OR PIPES	55
Y637 FIRE .38 CALIBER PISTOLS	45
Y642 LAY AM-2 MATTING FOR AIRCRAFT PARKING REVETMENTS	45
F175 INSTALL STEAM HEATING SYSTEM VALVES OR FITTINGS	45
Y676 PRACTICE EXPEDIENT METHODS	45

TABLE XIB
CONTINGENCY SUPERVISORS
(GRP430)

TASKS	PERCENT MEMBERS PERFORMING (N=11)
Y677 PRACTICE PERSONAL HYGIENE TECHNIQUES	100
Y679 PREPARE PERSONAL CLOTHING AND EQUIPMENT FOR DEPLOYMENT	100
Y636 ERECT TENTS	100
B26 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS	100
Y678 PRACTICE SELF-PROTECTION FROM EXTREME WEATHER	100
Y682 TEAR DOWN, INSPECT, CLEAN, AND REASSEMBLE M-16 RIFLES	100
Y638 FIRE M-16 RIFLES	100
C67 WRITE AIRMAN PERFORMANCE REPORTS (APR)	100
Y633 DON OR DOFF CHEMICAL WARFARE PERSONAL PROTECTIVE CLOTHING	100
Y661 PERFORM COVER AND CONCEALMENT TECHNIQUES	91
Y663 PERFORM DECONTAMINATION PROCEDURES FOR CHEMICAL WARFARE AGENTS	91
Y666 PERFORM FIRST AID LIFESAVING TECHNIQUES	91
Y639 IDENTIFY CHEMICAL WARFARE AGENTS	82
Y670 PERFORM MILITARY FIELD SANITATION TECHNIQUES	82
Y645 MAINTAIN CONTINGENCY HEATING SYSTEMS	82
Y676 PRACTICE EXPEDIENT METHODS	82
Y655 OPERATE IMMERSION HEATERS	82
D77 COUNSEL TRAINEES ON TRAINING PROGRESS	82
D74 CONDUCT OJT	82
A20 PLAN WORK ASSIGNMENTS	82
Y675 PRACTICE CONVOY TECHNIQUES	82
B38 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES	82
Y631 ASSEMBLE AND TOW AM-2 MATTING FOR RAPID RUNWAY REPAIR	82
B41 SUPERVISE APPRENTICE HEATING SYSTEMS SPECIALISTS (AFSC 54532)	73
E114 MAKE ENTRIES ON AF FORMS 561 (BASE CIVIL ENGINEERING WEEKLY SCHEDULE)	73
Y671 PERFORM WEAPONS FIRE CONTROL	73
Y657 OPERATE TENT HEATERS	73
D79 DETERMINE OJT TRAINING REQUIREMENTS	73
A22 SCHEDULE LEAVES OR PASSES	73
Y668 PERFORM INSTALLATION AND WORK PART SECURITY TECHNIQUES	73

APPENDIX B
CIVILIAN JOB SERIES DESCRIPTIONS

**PIPEFITTER
WG-4204**

Pipefitter, WG-10

The work involves installing, modifying, and repairing new and existing high-pressure piping systems and equipment such as steamheating, steam generation, and hydraulic systems, steam generators, flash and expansion tanks, condensate, vacuum, and circulating pumps, and radiators.

The pipefitter works from building plans, blueprints, and sketches to plan and lay out the routing, placement, pitch, elevation, pressure reduction, expansion, and operation of various piping systems and equipment. He installs, modifies, and repairs systems like those described above by setting up system routes, placing and cutting route openings, placing hangers for proper pitch and elevation, and determining and installing such things as risers, flexible branches, expansion joints, pumps, gauges, and pressure regulators in the combination needed to support the pressures of the systems and that ensure the proper operation of the systems. He also installs equipment like that described above by planning and completing the routing and placement of systems leading to the equipment, determining and placing the equipment at the proper levels and points in the systems, and joining, sealing, and testing systems and equipment for proper pressures, leak-free joints, and operation.

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UTILITY SYSTEMS REPAIRER-OPERATOR WG-4742

Utility Systems Repairer-Operator, WG-8

WG-8 Utility Systems Repairer-Operators perform various tasks in connection with the repair and operation of utilities for Federal buildings or facilities. Typical work assignments include the performance of various checks, tests, adjustments, and troubleshooting tasks to determine the need for and the performance of repair and operation work. The skill and knowledge, responsibility, physical effort, and working condition factors are described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Air Conditioning Equipment Mechanic	WG-5306-8	Utility Systems Repairer- Operator	WG-4742-8
Boiler Plant Operator	WG-5402-8		
Heating Equipment Mechanic	WG-5309-8		
Water Treatment Plant Operator	WG-5409-8	Utility Systems Repairer- Operator	WG-4742-8
Boiler Plant Operator	WG-5402-8		
Air Conditioning Equipment Mechanic	WG-5306-8		
Boiler Fireman	WG-5402-6	Maintenance Worker	WG-4749-8
Water Plant Operator	WG-5409-7		
Electrical Worker	WG-2805-8		
Air Conditioning Equipment Mechanic	WG-5306-8		

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Utility Systems Repairer-Operator, WG-8 (Continued)

Mixed Work Examples		Title, Code, and Grade	
Air Conditioning Equipment Mechanic	WG-5306-8	Air Conditioning Equipment Mechanic	WG-5306-8
Boiler Fireman	WG-5402-6		
Water Plant Operator	WG-5409-7		
Boiler Plant Operator	WG-5402-8		
Water Treatment Plant Operator	WG-5409-8	Utility Systems Operator	WG-5406-8
Heating Equipment Mechanic Helper	WG-5309-5		

WG-10 Utility Systems Repairer-Operators perform various tasks in connection with the repair and operation of utilities for Federal buildings or facilities. Typical work assignments include the performance of various checks, tests, adjustments, and troubleshooting tasks to determine the need for and the performance of repair and operation work. The skill and knowledge, responsibility, physical effort, and working condition factors are described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

Mixed Work Examples		Title, Code, and Grade	
Air Conditioning Equipment Mechanic	WG-5306-10		
Air Conditioning Equipment Operator	WG-5415-10	Utility Systems Repairer-Operator	WG-4742-10
Boiler Plant Operator	WG-5402-10		
Electrical Worker	WG-2805-8		
Air Conditioning Equipment Mechanic	WG-5306-10	Utility Systems Repairer-Operator	WG-4742-10
Air Conditioning Equipment Operator	WG-5415-10		
Boiler Plant Equipment Mechanic	WG-5309-10	Utility Systems Repairer-Operator	WG-4742-10
Boiler Plant Operator	WG-5402-10		
Air Conditioning Equipment Mechanic	WG-5306-10		
Electrician	WG-2805-10	Maintenance Mechanic	WG-4749-10
Boiler Plant Equipment Mechanic	WG-5309-10		
Boiler Fireman	WG-5402-6		

Utility Systems Repairer-Operator, WG-8 (Continued)

Air Conditioning
Equipment Mechanic WG-5306-10
Electrical Worker WG-2805-8
Air Conditioning
Equipment Operator WG-5415-9
Boiler Fireman WG-5402-5

Air Conditioning
Equipment Operator WG-5415-10
Air Conditioning
Equipment Mechanic WG-5306-8

Boiler Plant
Operator WG-5402-10
Heating Equipment
Mechanic WG-5309-8

Air Conditioning
Equipment Mechanic WG-5306-10

Air Conditioning
Equipment Operator WG-5415-10

Boiler Plant
Operator WG-5402-10

**MAINTENANCE MECHANIC
WG-4749**

Maintenance Worker, WG-7

The WG-7 Maintenance worker performs a variety of tasks involved in the upkeep of buildings, grounds, and related structures, fixtures, and utilities. Typical work assignments include the performance of visual examinations and operational tests to determine the need for, and the performance of, repair work on a level of difficulty and responsibility of trades such as those described in job grading standards for the kinds and levels of work shown in the following. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Carpentry	WG-4607-7	Maintenance	WG-4749-7
Plumbing	WG-4206-7	Worker	
Painting	WG-4102-7		
Roofer	WG-3606-7	Maintenance	WG-4749-7
Asphalt Worker	WG-3653-7	Worker	
Painting Worker	WG-4102-7		
Asphalt Worker	WG-3653-5	Maintenance Worker	WG-4749-7
Roofer	WG-3606-7		
Carpentry Worker	WG-4607-7		
Roofer	WG-3606-7	Roofer	WG-3606-7
Asphalt Worker	WG-3653-5		
Gardener WG-5003-6			
Plumbing Worker	WG-4206-7	Plumbing Worker	WG-4206-7
Asphalt Worker	WG-3653-5		
Cement Worker	WG-3602-6		

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Maintenance Worker, WG-8

The WG-8 Maintenance Worker performs a variety of tasks involved in the upkeep of buildings, grounds, and related structures, fixtures, and utilities. Typical work assignments include the performance of visual examinations and operational tests to determine the need for, and the performance of, repair work on a level of difficulty and responsibility of trades such as those described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Electrical Workers	WG-2805-8	Maintenance Worker	WG-4749-8
A/C Equipment Mechanic	WG-5306-8		
Carpentry Worker	WG-4607-7		
Sheet Metal Worker	WG-3806-8	Maintenance Worker	WG-4749-8
A/C Equipment Mechanic	WG-5306-8		
Heating Equipment Mechanic	WG-5309-8		
Cement Finisher	WG-3602-8	Maintenance Worker	WG-4749-8
Masonry Worker	WG-3603-8		
Pest controller	WG-5026-6		
Electrical Worker	WG-2805-8	Electrical Worker	WG-2805-8
Carpentry Worker	WG-4607-7		
Plumbing worker	WG-4206-7		

Maintenance Mechanic, WG-9

The WG-9 Maintenance Mechanic performs a variety of tasks involved in the upkeep of buildings, grounds, and related structures, fixtures, and utilities. Typical work assignments include the visual examinations and operational tests to determine the need for, and the performance of, repair work on a level of difficulty and responsibility of trades such as those described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Painter	WG-4102-9	Maintenance Mechanic	WG-4749-9
Plumber	WG-4206-9		
Carpenter	WG-4607-9		
Asphalt Worker	WG-3653-7	Maintenance Mechanic	WG-4749-9
Roofer	WG-3606-9		
Carpenter	WG-4607-9		
Roofer	WG-3606-9	Roofer	WG-3606-9
Asphalt Worker	WG-3653-7		
Cement Finisher	WG-3602-8		
Painter	WG-4102-9	Painter	WG-4102-9
Carpentry worker	WG-4607-7		

Maintenance Mechanic, WG-10

The WG-10 Maintenance Mechanic performs a variety of tasks involved in the upkeep of buildings, grounds, and related structures, fixtures, and utilities. Typical work assignments include the performance of visual examinations and operational tests to determine the need for, and the performance of, repair work on a level of difficulty and responsibility of trades such as those described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Electrician	WG-2805-10	Maintenance Mechanic	WG-4749-10
A/C Equipment Mechanic	WG-5306-10		
Sheet Metal Mechanic	WG-3806-10	Maintenance Mechanic	WG-4749-10
Boiler Plant Equipment Mechanic	WG-5309-10		
Electrician	WG-2805-10	Maintenance Mechanic	WG-4749-10
Mason	WG-3603-10		
Electrician	WG-2805-10	Electrician	WG-2805-10
Roofer	WG-3606-9		
Carpenter	WG-4607-9		
Boiler Plant Equipment Mechanic	WG-5309-10	Boiler Plant Equipment Mechanic	WG-5309-10
Electrical Worker	WG-2805-8		

**BOILER PLANT OPERATOR
WG-5402**

Boiler Fireman, WG-5

Work at this grade involves either hand-firing several furnaces and low-pressure boilers (up to and including 15 PSIG) by shoveling coal into firebox or operating several gas- or oil-fired, low-pressure boilers. The Boiler Fireman, WG-5, works alone as roving operator of several boilers at several different locations.

The fireman adjusts drafts to ensure proper combustion, rakes fires to obtain maximum combustion, and removes clinkers and ashes. He maintains boiler water levels and steam pressures according to requirements and prescribed limits and to meet demands for heat and hot water. He banks fires when there is no longer a requirement for steam.

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TS-8 SEPTEMBER 1969
FPM SUPPLEMENT 512-1

Boiler Fireman, WG-6

Work at this grade involves the tending of several high-pressure (over 15 pounds per square inch) coal stokers, or gas- or oil-fired boilers at separate locations where the maximum capacity of any one boiler does not exceed 70,000 pounds of steam per hour. As at the WG-5 level, the WG-6 fireman works alone as roving fireman of several boilers at several different locations.

The fireman shovels coal into stokers or adjusts controls of automatic boilers to regulate the flow of fuel. In addition to adjusting drafts as described at WG-5 level, he observes and adjusts such things at thermostats and dampers, temperature and pressure controls.

Boiler Plant Operator, WG-7

The work at this grade involves the operation of high-pressure automatic coal stoker, pulverized coal, gas or oil-fired boilers in a steam or high-temperature water boiler plant which requires the continuous attention of more than one operator. Generally, operators at this grade are assigned a certain portion of a large plant.

The operator ensures that the stoker is supplied with coal or adjusts fuel-feed controls of oil- or gas-fired boilers. He checks and makes adjustments to feed water regulators and pumps; checks steam and airflow meters, fuel gas-temperature recorders, gas or oil meters, and the operation of the coal conveyor system; and, under direction of a higher grade worker, fires up or takes boilers off the line. He frequently checks water level and steam pressure gauges and opens the intake valve to add water or to blow off steam. He draws boiler water sample for analysis.

Boiler Plant Operator, WG-8/9/10

All jobs graded by this portion of the standard have common features. The grade levels are based on the relative size of the plants, as measured by the amount of steam or equivalent that the plant is capable of producing per hour. The size of the plant which is an assembly of two or more boilers has a direct relationship to the nature and degree of skills and knowledges required and the responsibilities involved in performing the work. The larger plant normally involves the use of more powerful equipment, requiring the operator to have more knowledge of how to use the equipment and a greater responsibility to use the equipment to produce a greater amount of steam. There are more checkpoints with which to be concerned and more meters and charts to read, making the determination of necessary action more difficult. In addition, there is more auxiliary equipment such as pumps, water heaters, and fans to operate.

At these levels, the operator, either manually or through automatic controls, operates all equipment in a high-pressure boiler or high-temperature waterplant to produce and control the amount of steam necessary to meet demands. He periodically makes the rounds of the plant to visually check the equipment to see that it is operating properly. He may be assisted by lower grade plant operators.

**UTILITY SYSTEMS OPERATOR
WG-5406**

Utility Systems Operator

Grade 9 Utility Systems Operators use manual and automatic controls to operate two or more utility systems on a continuing basis. The work consists of starting, regulating, and stopping the equipment and performing routine operator maintenance. The operators regularly make rounds of the areas where the machinery and equipment are located, reading gauges and meters, making needed adjustments, taking and recording readings, and performing other related duties such as conducting chemical tests, and adding chemicals, lubricants, and water. Though installation and major repair are not part of their responsibility, grade 9 operators perform minor maintenance, such as replacing drive belts, correcting simple leaks, replacing filters, and insulating pipes.

The size and complexity of the systems operated and the level of difficulty and responsibility are equivalent to those described in job grading standards for the kinds and levels of work shown in the following examples. (Examples of similar jobs that are assigned to other occupations are also shown.)

<u>Mixed Work Examples</u>		<u>Title, Code, and Grade</u>	
Air Conditioning Equipment Operator	WG-5415-9	Utility Systems Operator	WG-5406-9
Boiler Plant Operator	WG-5402-9		
Water Treatment Plant Operator	WG-5409-9	Utility Systems Operator	WG-5406-9
Sewage Disposal Plant Operator	WG-5408-8		
Boiler Plant Operator	WG-5402-9		

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Utility Systems Operator, WG-5406

Mixed Work Examples		Title, Code, and Grade	
Boiler Plant Operator ¹	WG-5402-10	Utility Systems Operator	WG-5406-10
Air Conditioning Equipment Operator	WG-5415-9	Air Conditioning Equipment Operator	WG-5415-9
Boiler Plant Operator	WG-5402-8		
Water Treatment Plant Operator	WG-5409-7		
Boiler Plant Operator	WG-5402-9	Boiler Plant Operator	WG-5402-9
Water Treatment Plant Operator	WG-5409-7		
Sewage Disposal Plant Operator	WG-5408-8		

¹When job analysis shows WG-9 level and WG-10 has been assigned based on shift responsibility, the job should be properly titled, coded, and graded to WG-5406 series as shown, since the level of work without shift responsibility credit determines whether jobs are included or excluded in applying this standard. See Notes to Users section for further discussion.

**HEATING AND BOILER PLANT EQUIPMENT MECHANIC
WG-5309**

Heating Equipment Mechanic, WG-8

The work at this grade involves installing, recognizing the cause of faulty equipment, and making repairs to a variety of small and domestic heating units and systems. These include coal, oil, and gas burning floor furnaces, hot air furnaces, low-pressure hot water and steam boilers, and other equipment with comparable arrangements of heat sources, controls, and circulating methods. The units and systems serviced by the WG-8 mechanic are usually located in administrative buildings, small shops, single and multiple dwellings, and other areas with uncomplicated requirements. The combustion, ratio, and arrangement of heating surfaces and combustion chambers, the various methods of distribution, and the construction and operation of the units and systems are achieved with standard equipment that can be easily located and repaired.

The WG-8 mechanic works from oral and written maintenance instructions and blueprints as he traces and locates defects to determine the type and extent of necessary repairs. After receiving assignments, he plans his work; selects the proper replacement parts, tools, and testing devices; and makes the repairs under general supervision. Decisions concerning what units need to be repaired are not normally complicated by the need for specialized equipment, and a few testing techniques will usually locate the worn and broken parts.

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Boiler Plant Equipment Mechanic, WG-10

In Comparison with the WG-8 mechanic who installs and repairs small, uncomplicated, or domestic heating units and systems, the WG-10 mechanic installs and repairs units and systems that are larger and more complex with a greater variety of more complicated components and parts; they provide heat and power to areas with more critical and rigid requirements; and the heat source, circulating systems, and controls are more difficult to balance.

The WG-10 Boiler Plant Equipment Mechanic completes his assignments with the same kind of review as the WG-8 mechanic, but his job is more responsible because he makes more difficult and frequent decisions on a greater variety of more complex equipment, such as what adjustments are necessary and whether parts need to be substituted, replaced, repaired, or purchased.

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